

# The Effect of Variability on the Estimation of Quasar Black Hole Masses

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## ABSTRACT

We investigate the time-dependent variations of ultraviolet (UV) black hole mass estimates of quasars in the Sloan Digital Sky Survey (SDSS). From SDSS spectra of 615 high-redshift ( $1.69 < z < 4.75$ ) quasars with spectra from two epochs, we estimate black hole masses, using a single-epoch technique which employs an additional, automated night-sky-line removal, and relies on UV continuum luminosity and C IV  $\lambda 1549$  emission line dispersion. Mass estimates show variations between epochs at about the 30% level for the sample as a whole. We determine that, for our full sample, measurement error in the line dispersion likely plays a larger role than the inherent variability, in terms of contributing to variations in mass estimates between epochs. However, we use the variations in quasars with  $r$ -band spectral signal-to-noise ratio greater than 15 to estimate that the contribution to these variations from inherent variability is roughly 20%. We conclude that these differences in black hole mass estimates between epochs indicate variability is not a large contributor to the current factor of two scatter between mass estimates derived from low- and high-ionization emission lines.

*Subject headings:* galaxies: active — quasars: general — techniques: spectroscopic

## 1. Introduction

In active galactic nuclei (AGN) and quasars, it is now generally accepted that for low-ionization broad emission lines, such as  $H\beta$ , the line width is mostly controlled by gravity,

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and thus closely related to the mass of the quasar central black hole (Osterbrock & Shuder 1982; Peterson & Wandel 1999, 2000; Onken & Peterson 2002; Kollatschny 2003). However, there is some debate as to the physical processes responsible for producing the observed profile of higher ionization lines, such as C iv  $\lambda 1549$ . The C iv line has been observed to be both blueshifted (see, e.g. Wilkes 1984; Richards et al. 2002b) and asymmetric (Wilkes 1984; Vanden Berk et al. 2001) hinting that physical processes other than gravity may be at least partially responsible for the C iv profile. Recently, Baskin & Laor (2005) demonstrated that, due to these differences in line profile, black hole mass estimates involving C iv line width may be less accurate than previously believed, or even biased, perhaps with systematic over or underestimates of mass by a factor of a few.

If one does assume that the width of a given quasar broad emission line can be related to the velocity of gas in orbit around the central black hole, a black hole mass can be computed via the virial equation:

$$M_{BH} = f \frac{R(\Delta v)^2}{G}, \quad (1)$$

where  $f$  is a scale factor of order unity that depends on the geometry of the broad line region (BLR),  $R$  is the distance from the black hole to the specific portion of the BLR which contains the emitting gas in question (a distance which likely differs for each species), and  $\Delta v$  is the velocity width of the broad emission line itself. While line width is easily determined from a single-epoch spectrum, determining the BLR size is less straightforward. Reverberation mapping techniques have proven very successful in estimating BLR sizes, and by extension, determining the masses of the black holes at the centers of a few dozen active galactic nuclei (e.g., Wandel, Peterson, & Malkan 1999; Peterson et al. 2004). These radii are found by measuring the response time of variations in emission line flux to changes in continuum flux. Though simple in principle, measuring these response times requires constant spectral monitoring, and is observationally taxing. However, Wandel, Peterson, & Malkan (1999) and Kaspi et al. (2000), and later Kaspi et al. (2005), demonstrated that a simple scaling relationship exists between BLR size and continuum luminosity ( $R \propto L^\alpha$ ). Kaspi et al. (2005) determined that the size of the H $\beta$  BLR scales with both optical and UV continua, allowing for the use of continuum luminosity in both of these wavelength ranges as a proxy for BLR size and paving the way for reliable, single-epoch black hole mass estimates.

Single-epoch estimates have been calibrated using the H $\beta$  (Wandel, Peterson, & Malkan 1999) and Mg II  $\lambda 2798$  (McLure & Jarvis 2002) emission lines. Vestergaard (2002) developed a method of estimating black hole masses derived from C iv FWHM and  $\lambda L_\lambda(1350 \text{ \AA})$  (abbreviated  $L_{1350}$ ), calibrated by the corresponding reverberation-mapping masses, utilizing the scaling relationship determined by Kaspi et al. (2000). Namely,  $R_{CIV} \propto L_{1350}^{0.70}$ .

More recently, Peterson et al. (2004) reanalyzed a large amount of reverberation mapping data, removing lower-quality data and re-establishing the scaling relationships used for calibration of single-epoch mass estimates. Subsequently, Kaspi et al. (2005) used these revised relationships to update the BLR size-continuum luminosity relationships, and Bentz et al. (2006) made additional corrections after correcting for luminosity contributions from host galaxies’ starlight. These developments led to a re-calibration of UV black hole masses in Vestergaard & Peterson (2006), who utilized an empirically determined radius-luminosity relationship more consistent with photoionization theory:  $R_{\text{CIV}} \propto L_{1350}^{0.53}$ . Early results of a monitoring campaign to apply reverberation mapping to  $z \sim 3$  quasars indicate that, over 7 orders of magnitude in luminosity, the C IV BLR size-UV luminosity relationship has a slope similar to that of the H $\beta$  BLR size-UV luminosity relationship (Kaspi et al. 2007), confirming the assumptions made by Vestergaard & Peterson (2006).

Additionally, Vestergaard & Peterson (2006) calibrated an estimate for black hole mass which relies upon the dispersion of the C IV line ( $\sigma_{\text{CIV}}$ , the second moment about the mean), and the luminosity density at 1450Å:

$$\log M_{\text{BH}}(\text{C IV}) = \log \left[ \left( \frac{\sigma_{\text{CIV}}}{1000 \text{ km s}^{-1}} \right)^2 \left( \frac{\lambda L_{\lambda}(1450\text{\AA})}{10^{44} \text{ erg s}^{-1}} \right)^{0.53} \right] + (6.73 \pm 0.01). \quad (2)$$

Based on comparisons with reverberation mapping masses, Vestergaard & Peterson (2006) state that these masses are likely good to within a factor of 3.

One potential problem in estimating black hole masses from single-epoch spectra is the inherent variability of quasars. This variability is key to reverberation mapping techniques, but will necessarily inject uncertainties into single-epoch mass estimates. The optical and ultraviolet portions of quasar continua have long been known to vary in luminosity on the order of 10% – 20% on time scales from weeks to years (e.g., Smith & Haffleit 1963; Uomoto, Wills, & Wills 1976; Hook, McMahon, Boyle, & Irwin 1994; Giveon et al. 1999; de Vries, Becker, 2003). Vanden Berk et al. (2004), using a sample of  $\sim 25000$  quasars, confirmed known correlations, and parameterized relationships, between variability and rest-frame time lag, luminosity, rest-frame wavelength and redshift. Additionally, Wilhite et al. (2005, hereafter Paper I) completed the first study of the detailed dependence of variability upon wavelength, demonstrating that that variability increased with decreasing wavelength, but only at wavelengths less than 2500Å. Increased variability at shorter wavelengths, such as that seen in Paper I, and earlier (e.g., Cutri et al. 1985; Collier et al. 2001; Vanden Berk et al. 2004), can impact black hole mass estimates that rely on rest-frame UV luminosity.

In addition, the fluxes and profiles of quasar emission lines are known to vary with

time (e.g., Peterson 1993; Wanders & Peterson 1996; Wandel, Peterson, & Malkan 1999; Sergeev et al. 2001), mostly in response to fluctuations in continuum luminosity. C IV has been closely monitored in a relatively small number of low-redshift, low-luminosity objects like NGC 5548 (Clavel et al. 1991; Korista et al. 1995) and NGC 4151 (Crenshaw et al. 1996), as well as in a few high-redshift quasars (Kaspi et al. 2007). Recently, Wilhite et al. (2006, hereafter Paper II) studied C IV variability in an ensemble of  $\sim 100$  SDSS quasars with multiple-epoch spectroscopy, finding that the width of an individual C IV line increases with line flux, and varies by as much as 30%, on rest-frame time scales of weeks to months. Paper I focused on the variability of the quasar continuum, while Paper II centered on variability of the C IV line. Given the interest in black hole mass estimates, we feel there is a definite need to re-examine UV variability in the context of mass estimators, and to attempt to quantify the effect (or lack thereof) of variability on determining black hole masses.

We briefly describe the quasar sample and the additional, necessary spectrophotometric calibrations in §2. We describe the process used to estimate black hole masses, including the continuum- and line-fitting techniques used, in §3. The epoch-to-epoch black hole mass estimate differences are examined in §4. The results are discussed in §5, and we conclude in §6.

For consistency with Papers I and II, we assume a flat, cosmological-constant-dominated cosmology with parameter values  $\Omega_\Lambda = 0.7$ ,  $\Omega_M = 0.3$ , and  $H_0 = 70 \text{ km s}^{-1} \text{ Mpc}^{-1}$  to calculate luminosity distances. Though these parameter values differ slightly from recent measurements (e.g., Spergel et al. 2007), this should have little effect on results, as we are chiefly concerned with the effect of variability between epochs.

## 2. The Quasar Dataset

### 2.1. The Sloan Digital Sky Survey

The Sloan Digital Sky Survey (York et al. 2000), using a dedicated 2.5-meter telescope (Gunn et al. 2006) at the Apache Point Observatory in the Sacramento Mountains of New Mexico, has, through Summer 2005, acquired imaging and spectroscopic data for  $\sim 8000 \text{ deg}^2$ , mostly centered on the Northern Galactic Cap. A 54-chip drift-scan camera (Gunn et al. 1998) acquires imaging data which are reduced and calibrated by using the astrometric (Pier et al. 2003) and photometric (Lupton et al. 2001) software pipelines. The photometric system is normalized such that SDSS  $u, g, r, i$  and  $z$  magnitudes (Fukugita et al. 1996) are on the AB system (Smith et al. 2002). A 0.5-meter telescope monitors site photometric quality and extinction (Hogg, Finkbeiner, Schlegel, & Gunn 2001; Ivezić et al. 2004; Tucker et al.

2006).

After image processing, selected objects are targeted for spectroscopy (Strauss et al. 2002; Eisenstein et al. 2001; Richards et al. 2002a; Stoughton et al. 2002) and grouped in 3-degree diameter tiles (Blanton et al. 2003). For each tile, an aluminum plate is drilled with 640 holes reserved for roughly 500 galaxies, 50 quasars and 50 stars (40 calibration spectra—32 sky fibers and 8 reddening standards—are also taken with each plate). Plates are placed in the imaging plane of the telescope and the holes plugged with optical fibers running from the telescope to twin spectrographs.

SDSS spectra are obtained in three or four consecutive 15-minute observations and cover the observer-frame optical and near infrared, from 3900Å–9100Å. The **Spectro2d** pipeline flat-fields and flux calibrates spectra, and **Spectro1d** identifies spectral features and classifies objects by spectral type (Stoughton et al. 2002). Extragalactic objects with broad emissions lines ( $\text{FWHM} \gtrsim 1000 \text{ km s}^{-1}$ ) are defined to be quasars.

As we are interested in variations in spectroscopic mass-estimation techniques, we focus here on those quasars that have multiple spectroscopic observations. Through June 2004, objects on 181 different plates had been observed at least twice, with time lags between observations ranging from days to years. Fifty-three of these plates (containing roughly 2200 quasars) have observations more than 50 days apart, indicating that spectra from these observations have not been co-added and are, therefore, appropriate for variability studies (see Paper I for a lengthier discussion of these data). 52 of these 53 plate pairs are contained in the Fourth Data Release (DR4; Adelman-McCarthy et al. 2006).

## 2.2. Refinement of Spectroscopic Calibration

It was demonstrated in both Vanden Berk et al. (2004) and Paper I that additional spectrophotometric calibration beyond the standard SDSS processing is required for variability studies. Paper I contains a complete discussion of those calibration methods; we briefly summarize the salient points here. The **Spectro1d** pipeline determines three signal-to-noise (S/N) ratios for each spectrum by calculating the median S/N ratio per pixel in the sections of the spectrum corresponding to the SDSS  $g$ ,  $r$  and  $i$  filter transmission curves. Hereafter, we use the phrase “high-S/N epoch” to refer to the observation with the higher median  $r$ -band signal-to-noise ratio and “low-S/N epoch” to refer to the observation with the lower median  $r$ -band signal-to-noise ratio. Although most objects follow the plate-wide trend, this does not address the relative S/N values for any given individual object, nor does it correspond to an object’s relative line or continuum flux at a given epoch. The stars on a plate are used to

resolve calibration differences between the high- and low-S/N epochs, under the assumption that the majority of stars are non-variable (obviously variable stars are removed from this re-calibration). For each pair of observations, we create a re-calibration spectrum, equal to the ratio of the median stellar high-S/N epoch flux to the median stellar low-S/N flux, as a function of wavelength. This re-calibration spectrum is fitted with a 5th-order polynomial to preserve real wavelength dependences, but remove pixel-to-pixel noise (see Figure 5 of Paper I), leaving a smooth, relatively featureless curve as a function of wavelength. All low-S/N epoch spectra are rescaled by this “correction” spectrum.

In Papers I and II, we studied only those objects that had been shown to vary significantly between epochs. Here we measure C IV line width, and estimate the central black hole mass, for all objects in which the entire C IV line and the 1450Å luminosity are observed. (As discussed in § 3.3, this corresponds to objects with  $1.69 < z < 4.75$ .) Out of the main sample of 2210 quasars, 702 are at a redshift where C IV measurements can be made in the SDSS spectra. Of these, 87 (13%) are noted in ? for showing evidence of broad absorption near the C IV emission line. Because of the difficulties broad absorption lines (BALs) can create in estimating the continuum flux and fitting the C IV emission line these BAL quasars are removed, leaving 615 objects to comprise the main sample studied below. Table 1 gives a summary of the observations used in this paper, including the names and redshifts of the quasars observed, as well as the Modified Julian Dates (MJDs) and signal-to-noise ratios of the individual observations.

The distributions of the  $r$ -band spectral signal-to-noise ratio at both epochs are shown as histograms in Figure 1. The mean  $S/N_r$  at the high-S/N epoch ( $S/N_{r,\text{HSN}}$ ) is 12.0, while the mean  $S/N_{r,\text{LSN}} = 9.9$ .

Figure 2 shows  $S/N_{r,\text{HSN}}$  versus  $S/N_{r,\text{LSN}}$ . As mentioned above, “high-S/N” or “low-S/N” epoch is a plate-wide designation; thus a few individual objects actually have greater  $S/N_{r,\text{LSN}}$  than  $S/N_{r,\text{HSN}}$ . For the vast majority of objects, however  $S/N_{r,\text{HSN}} > S/N_{r,\text{LSN}}$ . In addition, most objects have  $S/N_r$  at the two epochs such that they lie near the line  $S/N_{r,\text{HSN}} = S/N_{r,\text{LSN}}$ . Therefore, when examining the effects of spectral signal-to-noise ratio upon variations in black hole mass estimates between epochs, we will rely upon  $S/N_{r,\text{HSN}}$ .

### 2.3. Sample Spectra

Figure 3 shows observed-frame spectra at both epochs for three quasars from the sample to demonstrate how spectral  $r$ -band signal-to-noise ratio relates to overall spectral quality. These three quasars, SDSS J150104.94–010727.9 (Quasar 149 in Table 1;  $S/N_{r,\text{HSN}}=4.9$ ),

SDSS J101416.97+484816.1 (Quasar 551;  $S/N_{r,\text{HSN}}=12.1$ ) and SDSS J 030449.86–000813.4 (Quasar 259;  $S/N_{r,\text{HSN}}=30.8$ ) were chosen to represent a range of  $S/N_{r,\text{HSN}}$  values. Only the region of the spectrum used in the estimation of black hole mass (corresponding to the rest-frame interval  $[1440\text{\AA}, 1710\text{\AA}]$ ; see §3) is shown.

### 3. Calculating Black Hole Mass Estimates

This paper uses the Vestergaard & Peterson (2006) UV black hole mass estimator, seen in Equation 2, which requires measuring the continuum flux at a wavelength blueward of the C IV line, as well as the dispersion of the C IV line itself. The measurements of these two quantities are described below.

#### 3.1. Sky Subtraction

It was determined in Paper II that occasional errors in the SDSS night-sky removal pipeline could lead to errors in continuum and line fitting. In a small fraction (less than 5%) of objects, night sky lines are significantly under- or over-subtracted. In Paper II, spectra were visually inspected for signs of poor night sky subtraction. For this work, with over 600 C IV emission lines to fit (and for future work with larger samples of SDSS quasars), night sky subtraction has been automated. The night sky lines for which the algorithm searches are OI  $\lambda 5577$ , Na  $\lambda 5890$ , OI  $\lambda 6300$  and the well-known atmospheric O<sub>2</sub> Fraunhofer A and B bands (covering the  $[7594\text{\AA}, 7621\text{\AA}]$  and  $[6867\text{\AA}, 6884\text{\AA}]$  intervals, respectively). If any of these known night sky lines lies in the part of the spectrum corresponding to the rest-frame interval  $[1440\text{\AA}, 1700\text{\AA}]$  (the interval used to measure continuum luminosity and line dispersion; see §§3.2–3.3), the algorithm tests to ensure that the pipeline night sky subtraction was done properly. The average flux in a  $10\text{\AA}$  region centered on the night sky line position ( $37\text{\AA}$  and  $27\text{\AA}$  regions are used for the wider A and B bands, respectively) is compared to the average flux of the  $25\text{\AA}$  range on either side of the  $10\text{\AA}$  region. If the night sky region flux is more than 3 standard deviations larger or smaller than the average flux of the surrounding region, then the flux in the night sky region is estimated using a linear interpolation based upon the pixels in the surrounding continuum region. If the  $25\text{\AA}$  range overlaps with the C IV emission line (corresponding to the rest-frame interval  $[1496\text{\AA}, 1596\text{\AA}]$ ), the region is truncated to include only known continuum flux. The flux density uncertainties in the individual pixels are not altered, however. This may lead to a slight overestimation of the errors in the given quantities, but it is not likely to have a large effect.

### 3.2. 1450Å Continuum Luminosity

After the night sky subtraction errors have been corrected, the 1450Å flux density,  $f_\lambda(1450)$ , is calculated by taking the mean of the flux density in the pixels corresponding to the rest-frame interval [1445Å, 1455Å]. This is translated to a luminosity density by calculating the luminosity distance analytically from the redshift, and then to luminosity by multiplying by wavelength:  $L_{1450} = 1450\text{Å} \times L_\lambda(1450)$ . Figure 4 shows the distribution of 1450Å luminosities,  $L_{1450}$  at both epochs. Values for  $L_{1450}$  range from 10 to roughly  $500 \times 10^{44} \text{ erg s}^{-1}$ , with a median at the high-S/N epoch of  $93.1 \times 10^{44} \text{ erg s}^{-1}$  and  $92.6 \times 10^{44} \text{ erg s}^{-1}$  at the low-S/N epoch.

The distribution of estimated uncertainties in  $L_{1450}$ , calculated through standard error propagation, with the standard deviation in flux in the [1445Å, 1455Å] interval used as the uncertainty in  $f_\lambda(1450)$ , is shown for both epochs in Figure 4. These uncertainties are roughly an order of magnitude smaller than the luminosities themselves, with a median of  $11.6 \times 10^{44} \text{ erg s}^{-1}$  at the high-S/N epoch and  $13.9 \times 10^{44} \text{ erg s}^{-1}$  at the low-S/N epoch.

### 3.3. C IV Line Dispersion

The dispersion of the C IV line is calculated in the same manner as in Paper II. We briefly describe that procedure here; for a full description, see §3 of that paper.

To avoid contamination from unidentified emission just redward of the C IV emission line (see, e.g., Wilkes 1984; Boyle 1990; Laor et al. 1994; Vanden Berk et al. 2001), as well as known emission from He II, O III], Al II] and Fe II, the red side of the continuum is fit over the rest-frame interval [1685Å, 1700Å]. The blue continuum is fit over the interval [1472Å, 1487Å]. Then, using all pixels corresponding to either of these wavelength ranges, the continuum is fit with a linear least squares algorithm (POLY\_FIT in IDL). Once the fit has been performed, the continuum fit is subtracted from the entire region of interest.

To measure the line profile, we integrate over the interval [1496Å, 1596Å]. This allows us to exclude potentially contaminating flux blueward of the line profile. For reasons of stability, we opt to use the line median, rather than the mean, in measuring the line center, as the mean is too easily affected by noisy pixels in the line wings. The median is simply the midpoint of the line flux, the wavelength which evenly divides the continuum-subtracted flux in the line profile.

We then calculate the line profile dispersion, the second moment about the median wavelength:



$$\sigma^2 = \frac{\int_{\text{CIV}} (\lambda - \lambda_{\text{median}})^2 F_{\lambda} d\lambda}{\int_{\text{CIV}} F_{\lambda} d\lambda}, \quad (3)$$

where C IV in the integrals simply means we are integrating over the [1496Å, 1596Å] interval containing the entire line profile. Line widths range from 1000 to 5000 km s<sup>−1</sup>, with median values of 3541 km s<sup>−1</sup> and 3531 km s<sup>−1</sup> at the high- and low-S/N epochs, respectively. A histogram of measured line widths for both epochs is shown in Figure 5.

To determine the uncertainties in these quantities, we use a Monte Carlo method. Noise is added to each pixel in the region of interest by assigning a random number drawn from a Gaussian distribution with mean equal to the measured flux in that pixel and standard deviation equal to the measured error in that pixel. The continuum is fit, and the line median and standard deviation calculated; this is done 1000 times per quasar. The standard deviation of the distribution of resulting values is assigned to be the error in that quantity. The uncertainties in the line width (as seen in Figure 5) are, for the most part, less than 500 km s<sup>−1</sup>, with a median uncertainty of 159 km s<sup>−1</sup> at the high-S/N epoch and 202 km s<sup>−1</sup> at the low-S/N epoch—like with L<sub>1450</sub>, the uncertainties are roughly an order of magnitude lower than the values themselves.

### 3.4. Single-Epoch Mass Estimates

Once the continuum luminosity (L<sub>1450</sub>) and emission line dispersion (σ<sub>CIV</sub>) have been calculated, it is straightforward to estimate the quasar’s black hole mass from Equation 2. This is done at both the high- and low-S/N epochs for all 615 objects in the main sample. The distributions of high- and low-S/N-epoch black hole masses are shown in Figure 6. The majority of objects are estimated to have high-S/N black hole masses in the range from 10<sup>8.5</sup> M<sub>⊙</sub> to 10<sup>9.5</sup> M<sub>⊙</sub>. The median high-S/N and low-S/N-epoch masses are 10<sup>8.88</sup> M<sub>⊙</sub> and 10<sup>8.87</sup> M<sub>⊙</sub>, respectively. The distributions of uncertainties in M<sub>BH</sub> (calculated by propagating measurement errors in L<sub>1450</sub> and σ<sub>CIV</sub>) at each epoch are shown in Figure 6. The median uncertainty at the high-S/N epoch is 10<sup>7.97</sup> M<sub>⊙</sub>; at the low-S/N epoch it is 10<sup>8.04</sup> M<sub>⊙</sub>.

Figure 7 shows the fractional uncertainty in L<sub>1450</sub>, σ<sub>CIV</sub>, and M<sub>BH</sub> as a function of S/N<sub>r</sub> at the high-S/N epoch. (The low-S/N versions of these plots are very similar and, therefore, not shown.) The uncertainty in the 1450Å luminosity appears to dominate the M<sub>BH</sub> measurement error. It should also be noted that for virtually all quasars with a signal-to-noise ratio greater than 15, our estimate of the measurement uncertainty for M<sub>BH</sub> is less than 10%.

Table 2 contains the relevant quantities in the estimation of black hole mass at both epochs, including the masses themselves, and the measured luminosities and line dispersions.

## 4. Measuring the Consistency of Estimates of $M_{BH}$

### 4.1. Variations in Luminosity and Line Dispersion

Figure 8 shows the high-S/N epoch values versus low-S/N epoch values for 1450Å luminosity and C IV. The width of these distributions is due to a combination of the intrinsic variability of the quasars and the uncertainty in the measurement of those quantities.

To measure the relative change in a quantity, we will use the fractional change with respect to the average over the two epochs observed. The fractional change in 1450Å luminosity is given by Equation 4:

$$\Delta L_{1450} = 2(L_{1450,HSN} - L_{1450,LSN}) / (L_{1450,HSN} + L_{1450,LSN}) \quad (4)$$

$\Delta\sigma_{CIV}$  and  $\Delta M_{BH}$  are defined similarly.

The two panels of Figure 9 show the distribution of values of  $\Delta L_{1450}$  and  $\Delta\sigma_{CIV}$ . The sample standard deviation for the  $\Delta L_{1450}$  distribution is 0.161, corresponding to a change in continuum luminosity of roughly 16% between epochs. The sample standard deviation of the  $\sigma_{CIV}$  distribution is 0.108, which corresponds to a change in line width of  $\sim 11\%$  between epochs. It should come as no surprise that the continuum luminosity exhibits larger variations between epochs than the line dispersion. Much of this variation is due to the intrinsic variability of the quasars themselves, and it is well known that quasars' continua are more variable than their emission lines (see, e.g., Paper I, Figure 13).

Figure 10 shows the fractional changes in  $L_{1450}$  and  $\sigma_{CIV}$  as a function of high-S/N epoch signal-to-noise ratio. The average variations are clearly, and unsurprisingly, larger for quasars with low spectral signal-to-noise ratios ( $S/N_{r,HSN} \lesssim 15$ ) than for quasars with high values ( $(S/N_{r,HSN} \gtrsim 15)$ ). However, the variations are nonzero for quasars with the highest spectral signal-to-noise ratios, an indication that intrinsic variability does play a role in these variations.

The fractional changes in continuum luminosity and C IV line dispersion are shown as a function of rest-frame time lag between epochs ( $\Delta\tau$ ) in Figure 11. To test the role of variability in these, we divide the quasars into two bins in  $\Delta\tau$ , as suggested by the distribution of observations in Figure 11: one bin for quasars with  $\Delta\tau < 50$  days, and another for quasars with  $\Delta\tau > 50$  days. In intrinsically time-variable populations, one would expect the variations in these quantities to show a time dependence, as seen in structure functions (di Clemente et al. 1996; de Vries et al. 2005).  $\Delta L_{1450}$  shows such a dependence. The mean  $\Delta L_{1450}$  in the low- $\Delta\tau$  bin is 0.11; in the high- $\Delta\tau$  bin, it is 0.18. However there is no such dependence for  $\Delta\sigma_{CIV}$ . The mean values of  $\Delta\sigma_{CIV}$  are 0.099 and 0.092 for the low- and

high- $\Delta\tau$  bins, respectively.

This indicates that the intrinsic variability of the quasars themselves plays a larger role in the variations seen in  $L_{1450}$  than in those seen in  $\sigma_{CIV}$ . The fact that there appears to be little difference in the size of the  $\sigma_{CIV}$  variations between the low- $\Delta\tau$  and high- $\Delta\tau$  bins indicates that these variations are likely dominated by measurement uncertainty, not by intrinsic variability in the width of these lines. This also suggests that the measurement errors quoted in § 3.3 and Table 2 may be underestimated.

#### 4.2. Variations in Estimated Black Hole Mass

The estimate for black hole masses at the high-S/N epoch is plotted against the mass estimate from the low-S/N epoch in Figure 12. Most quasars do lie near the  $M_{BH,HSN} = M_{BH,LSN}$  line, indicating good general agreement in estimated mass measurements between the two epochs.

Figure 13 shows the distribution in fractional change in the estimate of black hole mass between epochs,  $\Delta M_{BH}$ . The standard deviation is 0.301, corresponding to a roughly 30% change in the estimate between epochs. This scatter represents total inter-epoch variation in the mass estimate, due to variations in either  $L_{1450}$ ,  $\sigma_{CIV}$ , or both. Some of this change is simply due to random error in the measurements. The rest of this scatter is due to the intrinsic variability of the quasars’ luminosities and line dispersions between epochs.

Figure 15 shows the fractional change in estimated black hole mass as a function of the fractional change in luminosity and  $\sigma_{CIV}$  line dispersion. Here it is quite clear that the line dispersion variations dominate the variations in black hole mass. This obviously follows from Equation 2, as the mass estimate is more strongly dependent on line dispersion than continuum luminosity. In fact, there appears to be a roughly linear relationship, with a slope of roughly 2, equal to the exponent for  $\sigma_{CIV}$ . However, it did not have to be the case that the line dispersion dominates the variations in black hole mass—if the variations in luminosity were much larger than those of the line dispersion, then Figure 15 might look quite different.

In fact, given that the time delays between observations for our sample are only of the order of weeks or months in the quasars’ rest frames, one would expect that the continuum luminosity variations would play a larger role in samples with longer time baselines, as structure function studies (di Clemente et al. 1996; de Vries et al. 2005) demonstrate that longer time baselines lead to larger average variations between observations.

For now, we adopt  $\sim 30\%$  as the contribution of inter-epoch variations to the uncer-

tainty in the estimation of black hole masses from SDSS spectra, using the  $\sigma_{\text{CIV}}$  line and nearby continuum. Given the apparent dominance of measurement uncertainty in the inter-epoch variations in the measured line dispersion, and the line dispersion’s dominance of the variations in black hole mass estimate, it is not clear that we are able to set a lower limit on the effect of variability that lies below 30%.

Figure 14 shows the fractional change in  $M_{\text{BH}}$  as a function of the  $r$ -band spectral signal-to-noise ratio. As was the case with  $\Delta L_{1450}$  and  $\Delta\sigma_{\text{CIV}}$ , the width of the  $\Delta M_{\text{BH}}$  distribution decreases with increasing  $S/N_{r,\text{HSN}}$ . However, though the distribution narrows, it does not appear to be approaching zero width.

Though some of the scatter is a result of measurement uncertainties, the width of the  $\Delta M_{\text{BH}}$  distribution for high ( $S/N_{r,\text{HSN}} > 15$ ) signal-to-noise ratio objects does give some sense for the magnitude of the variations due to inherent quasar variability. Thus, though it is only a rough estimate, we adopt the standard deviation of the  $\Delta M_{\text{BH}}$  distribution as a rough estimate for the size of the inter-epoch variations in estimated black hole mass. For the 148 quasars with  $S/N_{r,\text{HSN}} > 15$ , the standard deviation is 0.219, corresponding to a roughly 20% change. This is decidedly larger than the  $M_{\text{BH}}$  measurement uncertainty of less than 10% for virtually all quasars, as seen in Figure 7 and discussed in § 3.4

## 5. Discussion

Mass estimates of objects in the main sample are consistent between epochs at the 30% level. Given that the mass estimate is a function of the line width squared, but only the square root of the luminosity, it should not come as a surprise that the variations in mass estimates are more strongly dependent on  $\Delta\sigma_{\text{CIV}}$  than on  $\Delta L_{1450}$ .

Even with the re-calibrated UV black hole masses, Vestergaard & Peterson (2006) find a scatter of a factor of about 2 between the UV and optical mass estimates. Variability of the quasar continuum luminosity and line width was thought to be a possible source for this scatter. However, this scatter is much larger than the differences in mass estimates seen between epochs in either our full sample or the quasars with signal-to-noise ratio greater than 15. This suggests that variability is not a likely cause for the majority of this scatter.

That said, if improvements in UV techniques are possible, variability will set an ultimate limit on the precision of these techniques; it is unlikely that any estimate that relies solely on the C IV emission line could do better than the 20% uncertainty in  $M_{\text{BH}}$  that comes solely from the inherent variability of the continuum luminosity and C IV line dispersion, as suggested by those quasars with  $S/N_{r,\text{HSN}} > 15$ .

## 6. Conclusions

We have explored the effect of continuum and C IV emission line variability on single-epoch estimators of quasar black hole mass.

1) Quasar black hole mass estimates determined from SDSS spectra of the rest-frame ultraviolet show inter-epoch variations at the 30% level, due to the combination of the intrinsic variability of quasars and uncertainty in the measurement of continuum luminosity and C IV emission line width.

2) For our full sample, measurement error and inherent quasar variability contribute roughly equally to the inconsistencies between epochs in the estimation of  $M_{\text{BH}}$ .

3) The  $\sim 20\%$  uncertainty in  $M_{\text{BH}}$  due to inherent variability, as suggested by the quasars with  $S/N_{r,\text{HSN}} > 15$ , sets a lower limit on the reproducibility of future UV black hole mass estimates.

4) Current UV black hole mass estimates for high-redshift quasars are believed to only be accurate to a factor of two, based on correlations seen with low-ionization-line mass estimates, but the smaller scatter seen here between epochs (30% for the full sample) seems to indicate that much of this scatter is yet to be understood.

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Table 1. Variable Quasar Sample. HSN and LSN indicate the high- and low-S/N ratio epochs, respectively.

Number	SDSS J	MJD		HSN	$z$	LSN	$S/N_r$	
		HSN	LSN				HSN	LSN
1	100543.42–005559.9	51910	51581	$1.712 \pm 0.002$	$1.717 \pm 0.002$		8.4	7.0
2	100356.15–005940.4	51910	51581	$2.108 \pm 0.002$	$2.108 \pm 0.001$		16.9	15.3
3	100013.37+011203.2	51910	51581	$1.801 \pm 0.003$	$1.805 \pm 0.001$		12.3	11.4
4	100246.85+002104.0	51910	51581	$2.172 \pm 0.002$	$2.169 \pm 0.002$		19.4	17.5
5	100412.88+001257.5	51910	51581	$2.240 \pm 0.002$	$2.243 \pm 0.002$		11.1	9.5
6	100428.43+001825.6	51910	51581	$3.045 \pm 0.001$	$2.989 \pm 0.046$		16.3	11.2
7	100623.58+004141.1	51910	51581	$1.919 \pm 0.001$	$1.916 \pm 0.001$		9.3	7.6
8	100715.53+004258.3	51910	51581	$1.676 \pm 0.001$	$1.677 \pm 0.002$		9.7	9.4
9	111603.99–011412.1	51984	51608	$2.174 \pm 0.002$	$2.177 \pm 0.002$		16.1	15.0
10	111502.65–002344.0	51984	51608	$1.960 \pm 0.002$	$1.959 \pm 0.002$		12.9	9.5
11	111201.25–011324.4	51984	51608	$2.237 \pm 0.002$	$2.240 \pm 0.002$		20.6	13.1
12	111319.93+010508.9	51984	51608	$1.855 \pm 0.002$	$1.854 \pm 0.003$		13.8	8.7
13	111642.34+000557.3	51984	51608	$2.151 \pm 0.002$	$2.155 \pm 0.002$		10.4	7.9
14	111858.55+000654.8	51984	51608	$2.436 \pm 0.004$	$2.457 \pm 0.001$		20.8	16.2
15	114745.57–005609.5	51959	51584	$1.941 \pm 0.002$	$1.946 \pm 0.003$		18.2	14.5
16	114646.40–010554.3	51959	51584	$2.119 \pm 0.001$	$2.119 \pm 0.002$		10.4	6.6
17	114534.51–004338.7	51959	51584	$1.750 \pm 0.002$	$1.747 \pm 0.002$		12.0	7.4
18	114547.54–003106.7	51959	51584	$2.043 \pm 0.002$	$2.029 \pm 0.004$		17.1	11.1
19	114530.42–001159.3	51959	51584	$1.751 \pm 0.002$	$1.751 \pm 0.002$		8.2	6.2
20	114311.23–002133.0	51959	51584	$1.920 \pm 0.001$	$1.911 \pm 0.002$		11.6	7.5
21	114220.26–001216.3	51959	51584	$2.486 \pm 0.007$	$2.490 \pm 0.005$		15.4	9.5
22	114211.59–005344.2	51959	51584	$1.919 \pm 0.002$	$1.919 \pm 0.002$		22.7	16.4
23	114201.24–004442.1	51959	51584	$1.725 \pm 0.002$	$1.720 \pm 0.002$		7.6	4.6
24	114104.35+010526.2	51959	51584	$1.692 \pm 0.002$	$1.691 \pm 0.002$		10.4	6.6
25	114410.13+001813.7	51959	51584	$1.792 \pm 0.002$	$1.792 \pm 0.002$		16.9	8.4
26	114752.67+010430.7	51959	51584	$2.072 \pm 0.001$	$2.072 \pm 0.002$		13.5	7.7
27	114948.81+000855.8	51959	51584	$1.970 \pm 0.001$	$1.968 \pm 0.004$		12.9	10.9
28	115554.11–010340.8	51943	51662	$1.969 \pm 0.003$	$1.954 \pm 0.004$		10.8	8.6
29	115154.83–005904.6	51943	51662	$1.928 \pm 0.002$	$1.930 \pm 0.001$		12.9	7.6

Table 1—Continued

Number	SDSS J	MJD		HSN	$z$	$S/N_r$	
		HSN	LSN			HSN	LSN
30	115238.98–004606.1	51943	51662	$1.762 \pm 0.002$	$1.766 \pm 0.001$	18.3	12.6
31	115157.05–001412.6	51943	51662	$1.654 \pm 0.002$	$1.654 \pm 0.001$	11.9	9.0
32	115043.87–002354.0	51943	51662	$1.976 \pm 0.001$	$1.975 \pm 0.001$	40.0	27.2
33	115105.33+002928.3	51943	51662	$1.769 \pm 0.001$	$1.772 \pm 0.002$	12.9	8.3
34	115058.73+005504.4	51943	51662	$1.753 \pm 0.002$	$1.755 \pm 0.001$	10.9	7.7
35	115115.38+003827.0	51943	51662	$1.880 \pm 0.002$	$1.886 \pm 0.002$	23.7	15.0
36	115213.55+001946.7	51943	51662	$1.834 \pm 0.002$	$1.834 \pm 0.001$	8.0	7.3
37	120142.24–001639.9	51930	51663	$1.993 \pm 0.002$	$1.982 \pm 0.001$	27.6	15.2
38	115826.94–000701.4	51930	51663	$1.808 \pm 0.002$	$1.809 \pm 0.002$	11.4	6.3
39	115254.79+002010.5	51930	51663	$2.359 \pm 0.002$	$2.365 \pm 0.002$	13.0	5.4
40	115723.76+005419.6	51930	51663	$1.841 \pm 0.003$	$1.843 \pm 0.002$	20.0	8.9
41	124524.59–000937.9	51928	51660	$2.084 \pm 0.002$	$2.084 \pm 0.002$	29.7	20.8
42	124540.99–002744.7	51928	51660	$1.693 \pm 0.002$	$1.692 \pm 0.002$	18.0	16.3
43	124356.22–000021.8	51928	51660	$1.837 \pm 0.002$	$1.836 \pm 0.002$	9.8	7.2
44	124310.79–003640.7	51928	51660	$2.039 \pm 0.001$	$2.040 \pm 0.000$	9.6	8.7
45	124242.11+001157.9	51928	51660	$2.159 \pm 0.002$	$2.158 \pm 0.002$	14.2	9.4
46	124551.44+010505.0	51928	51660	$2.809 \pm 0.001$	$2.809 \pm 0.001$	19.1	17.8
47	130242.61–000728.1	51689	51994	$1.721 \pm 0.001$	$1.720 \pm 0.002$	25.1	23.0
48	130157.36–001532.5	51689	51994	$1.975 \pm 0.002$	$1.971 \pm 0.002$	14.5	11.6
49	130033.29–000652.5	51689	51994	$2.078 \pm 0.001$	$1.507 \pm 0.003$	4.4	4.6
50	125818.59–004631.0	51689	51994	$1.831 \pm 0.002$	$1.830 \pm 0.002$	10.8	8.8
51	125928.80–002730.0	51689	51994	$1.907 \pm 0.001$	$1.905 \pm 0.002$	9.4	7.4
52	125710.91–002641.2	51689	51994	$1.783 \pm 0.002$	$1.785 \pm 0.002$	16.8	16.1
53	125532.99–001642.6	51689	51994	$2.033 \pm 0.001$	$2.036 \pm 0.002$	11.9	10.4
54	125617.52–001918.2	51689	51994	$1.769 \pm 0.002$	$1.770 \pm 0.002$	7.9	5.5
55	125359.69–003227.4	51689	51994	$1.692 \pm 0.001$	$1.686 \pm 0.002$	10.7	10.7
56	125359.62–000540.7	51689	51994	$1.977 \pm 0.002$	$1.982 \pm 0.002$	9.7	8.2
57	125254.53–000555.7	51689	51994	$1.859 \pm 0.001$	$1.863 \pm 0.001$	3.6	3.3
58	125329.98+000730.1	51689	51994	$2.669 \pm 0.003$	$2.694 \pm 0.001$	6.2	6.3

Table 1—Continued

Number	SDSS J	MJD		HSN	$z$	$S/N_r$	
		HSN	LSN			HSN	LSN
59	125810.14+005535.4	51689	51994	$2.128 \pm 0.001$	$2.126 \pm 0.002$	2.6	2.6
60	125743.93+005733.5	51689	51994	$1.805 \pm 0.000$	$1.811 \pm 0.002$	22.0	22.5
61	125818.26+010613.8	51689	51994	$1.728 \pm 0.001$	$1.730 \pm 0.002$	13.1	13.9
62	125656.19+002121.1	51689	51994	$2.016 \pm 0.001$	$2.003 \pm 0.002$	3.8	3.3
63	130029.02+004637.2	51689	51994	$1.868 \pm 0.001$	$1.865 \pm 0.002$	18.0	18.4
64	130019.99+002641.4	51689	51994	$1.754 \pm 0.002$	$1.752 \pm 0.002$	17.1	16.6
65	130132.67+003801.8	51689	51994	$1.828 \pm 0.002$	$1.830 \pm 0.002$	5.1	5.7
66	130127.19+001849.0	51689	51994	$2.117 \pm 0.001$	$2.119 \pm 0.002$	7.2	7.3
67	131549.26−004314.1	51985	51585	$1.960 \pm 0.002$	$1.964 \pm 0.002$	9.2	11.4
68	131052.51−005533.2	51985	51585	$4.159 \pm 0.005$	$4.160 \pm 0.001$	11.9	12.1
69	131128.35+004929.6	51985	51585	$2.809 \pm 0.002$	$2.807 \pm 0.001$	13.4	10.6
70	131540.48−000633.3	51985	51585	$2.107 \pm 0.002$	$2.107 \pm 0.001$	11.8	10.3
71	131426.44+010545.3	51985	51585	$1.838 \pm 0.002$	$1.837 \pm 0.003$	10.8	7.4
72	131630.46+005125.5	51985	51585	$2.403 \pm 0.002$	$2.405 \pm 0.001$	18.3	11.7
73	131840.95+003103.9	51984	51665	$1.773 \pm 0.002$	$1.780 \pm 0.001$	8.2	6.7
74	131913.99+005251.9	51984	51665	$1.827 \pm 0.002$	$1.829 \pm 0.001$	9.3	5.8
75	132009.10+002336.7	51984	51665	$1.713 \pm 0.002$	$1.709 \pm 0.001$	14.8	12.0
76	132314.50+003250.7	51984	51665	$1.960 \pm 0.001$	$1.961 \pm 0.001$	8.8	6.3
77	132333.04+004750.3	51984	51665	$1.779 \pm 0.002$	$1.775 \pm 0.001$	26.4	19.5
78	133018.00−010238.5	51959	51663	$2.126 \pm 0.002$	$2.127 \pm 0.002$	10.5	7.2
79	132750.93−000340.0	51959	51663	$1.794 \pm 0.002$	$1.794 \pm 0.001$	10.3	7.1
80	132410.46−011243.7	51959	51663	$1.836 \pm 0.002$	$1.835 \pm 0.002$	6.6	5.2
81	132214.82+005419.9	51959	51663	$2.145 \pm 0.002$	$2.148 \pm 0.002$	19.6	15.0
82	132555.11+011423.6	51959	51663	$1.960 \pm 0.002$	$1.953 \pm 0.003$	7.5	5.8
83	132812.09+005643.2	51959	51663	$2.024 \pm 0.002$	$2.024 \pm 0.002$	19.5	15.2
84	133513.43−004641.1	51955	51662	$2.027 \pm 0.004$	$2.039 \pm 0.001$	10.0	6.8
85	133037.05−004529.4	51955	51662	$2.108 \pm 0.002$	$2.106 \pm 0.001$	16.2	10.1
86	132944.35+004004.6	51955	51662	$2.312 \pm 0.002$	$2.311 \pm 0.002$	22.0	17.1
87	133138.50+004221.1	51955	51662	$2.429 \pm 0.004$	$2.438 \pm 0.002$	16.2	13.2

Table 1—Continued

Number	SDSS J	MJD		HSN	$z$	$S/N_r$	
		HSN	LSN			HSN	LSN
88	133125.93+004414.0	51955	51662	$2.022 \pm 0.002$	$2.023 \pm 0.002$	15.2	12.9
89	133241.02+010237.6	51955	51662	$1.752 \pm 0.002$	$1.755 \pm 0.001$	13.5	10.6
90	133823.04+001611.8	51955	51662	$2.162 \pm 0.002$	$2.163 \pm 0.002$	17.3	10.8
91	133939.01+001021.6	51955	51662	$2.126 \pm 0.002$	$2.129 \pm 0.001$	10.4	4.6
92	134636.52+011155.2	51943	51666	$1.673 \pm 0.001$	$1.677 \pm 0.002$	6.7	8.6
93	134755.67+003935.1	51943	51666	$3.813 \pm 0.001$	$3.816 \pm 0.001$	6.2	7.6
94	134834.97+010626.2	51943	51666	$1.926 \pm 0.002$	$1.929 \pm 0.002$	20.2	19.6
95	135048.91+001522.0	51943	51666	$1.834 \pm 0.002$	$1.834 \pm 0.002$	8.3	8.3
96	140344.06−003359.3	51942	51641	$1.744 \pm 0.002$	$1.740 \pm 0.001$	9.7	7.0
97	140323.39−000606.9	51942	51641	$2.460 \pm 0.001$	$2.454 \pm 0.002$	27.7	22.3
98	140114.28−004537.1	51942	51641	$2.522 \pm 0.001$	$2.504 \pm 0.008$	14.2	12.8
99	135951.09−004250.4	51942	51641	$2.063 \pm 0.001$	$2.063 \pm 0.001$	15.5	12.8
100	135735.01−004648.9	51942	51641	$1.771 \pm 0.002$	$1.770 \pm 0.002$	27.1	25.2
101	135844.57−011055.1	51942	51641	$1.961 \pm 0.002$	$1.961 \pm 0.001$	16.7	18.0
102	135603.51−010421.9	51942	51641	$1.933 \pm 0.001$	$1.932 \pm 0.002$	14.2	14.1
103	135605.41−010024.4	51942	51641	$1.886 \pm 0.002$	$1.877 \pm 0.002$	12.6	8.9
104	135534.38−000841.7	51942	51641	$1.789 \pm 0.002$	$1.792 \pm 0.002$	9.6	7.7
105	135247.96−002351.6	51942	51641	$1.670 \pm 0.003$	$1.669 \pm 0.002$	6.3	4.5
106	135623.29+004427.2	51942	51641	$1.977 \pm 0.002$	$1.981 \pm 0.002$	10.7	10.7
107	135445.66+002050.3	51942	51641	$2.503 \pm 0.001$	$2.508 \pm 0.002$	23.0	22.5
108	135514.61+001157.4	51942	51641	$1.806 \pm 0.002$	$1.808 \pm 0.003$	15.2	14.2
109	135721.77+005501.2	51942	51641	$1.997 \pm 0.001$	$1.996 \pm 0.001$	22.2	19.8
110	135828.74+005811.5	51942	51641	$3.922 \pm 0.001$	$3.931 \pm 0.001$	9.5	7.1
111	140253.25+002921.2	51942	51641	$1.939 \pm 0.002$	$1.936 \pm 0.002$	11.6	10.5
112	140224.15+003002.2	51942	51641	$2.418 \pm 0.002$	$2.418 \pm 0.003$	18.4	13.7
113	142033.25−003233.3	51609	51957	$2.676 \pm 0.007$	$2.682 \pm 0.008$	11.2	10.9
114	141951.60−004605.9	51609	51957	$1.937 \pm 0.001$	$1.933 \pm 0.003$	6.6	7.2
115	141734.28+005730.1	51609	51957	$2.407 \pm 0.001$	$2.403 \pm 0.002$	5.0	4.8
116	141822.91−000054.5	51609	51957	$2.045 \pm 0.002$	$2.048 \pm 0.002$	16.0	15.8

Table 1—Continued

Number	SDSS J	MJD		HSN	$z$	LSN	$S/N_r$	
		HSN	LSN				HSN	LSN
117	141937.59–000132.4	51609	51957	$1.837 \pm 0.002$	$1.839 \pm 0.002$		10.3	9.0
118	142045.98–000517.9	51609	51957	$2.196 \pm 0.002$	$2.193 \pm 0.002$		9.7	10.8
119	141956.96+010652.6	51609	51957	$2.206 \pm 0.003$	$2.207 \pm 0.002$		9.3	9.5
120	142205.10–000120.7	51609	51957	$1.860 \pm 0.002$	$1.863 \pm 0.002$		13.5	11.2
121	142205.56+004143.2	51609	51957	$2.155 \pm 0.002$	$2.157 \pm 0.002$		8.7	8.0
122	143628.46–003840.2	51637	51690	$2.052 \pm 0.002$	$2.048 \pm 0.001$		20.1	16.5
123	143229.24–010616.1	51637	51690	$2.085 \pm 0.002$	$2.086 \pm 0.002$		28.8	26.9
124	143255.35–003109.2	51637	51690	$2.071 \pm 0.002$	$2.069 \pm 0.001$		12.3	14.6
125	143116.86–004637.7	51637	51690	$2.211 \pm 0.002$	$2.211 \pm 0.001$		12.8	12.0
126	142954.48+002327.5	51637	51690	$1.992 \pm 0.001$	$2.000 \pm 0.001$		10.6	9.8
127	143124.03+002302.7	51637	51690	$1.947 \pm 0.002$	$1.941 \pm 0.000$		9.2	9.0
128	143307.40+003319.1	51637	51690	$2.743 \pm 0.001$	$2.744 \pm 0.001$		11.4	11.3
129	143436.51+010522.2	51637	51690	$2.202 \pm 0.002$	$2.200 \pm 0.001$		10.7	11.1
130	143601.58+002041.9	51637	51690	$1.787 \pm 0.001$	$1.267 \pm 0.001$		12.8	21.5
131	145817.52–004115.7	51994	51666	$2.618 \pm 0.001$	$2.615 \pm 0.001$		12.1	10.9
132	145903.25–002256.4	51994	51666	$2.012 \pm 0.001$	$1.999 \pm 0.004$		12.1	8.9
133	145722.70–010800.9	51994	51666	$2.232 \pm 0.002$	$2.232 \pm 0.002$		27.5	21.4
134	145613.19–003652.9	51994	51666	$1.760 \pm 0.002$	$1.760 \pm 0.002$		6.1	4.1
135	145555.00–003713.4	51994	51666	$1.948 \pm 0.002$	$1.945 \pm 0.002$		9.3	5.5
136	145302.09–010524.4	51994	51666	$1.808 \pm 0.002$	$1.806 \pm 0.002$		27.6	17.9
137	145128.92–005655.7	51994	51666	$2.114 \pm 0.002$	$2.114 \pm 0.002$		18.2	15.7
138	145246.52+003450.5	51994	51666	$2.542 \pm 0.001$	$2.546 \pm 0.002$		2.8	4.0
139	145155.24+000521.9	51994	51666	$2.018 \pm 0.002$	$2.021 \pm 0.002$		13.1	11.4
140	145317.44+003441.1	51994	51666	$2.164 \pm 0.002$	$2.164 \pm 0.002$		17.1	12.4
141	145337.98+002010.6	51994	51666	$1.862 \pm 0.002$	$1.861 \pm 0.002$		10.3	6.4
142	145429.65+004121.2	51994	51666	$2.659 \pm 0.001$	$2.638 \pm 0.005$		14.1	9.7
143	145447.70+003436.3	51994	51666	$1.914 \pm 0.001$	$1.910 \pm 0.002$		14.1	10.9
144	145633.42+000555.4	51994	51666	$1.836 \pm 0.002$	$1.839 \pm 0.001$		6.4	5.6
145	145815.22+003908.6	51994	51666	$2.022 \pm 0.002$	$2.013 \pm 0.003$		10.4	8.5

Table 1—Continued

Number	SDSS J	MJD		HSN	$z$	LSN	$S/N_r$	
		HSN	LSN				HSN	LSN
146	145754.05+003638.9	51994	51666	$2.760 \pm 0.001$	$2.760 \pm 0.001$		12.7	11.3
147	150826.49–003026.9	51990	51614	$1.650 \pm 0.002$	$1.648 \pm 0.000$		10.0	6.4
148	150314.57–000905.8	51990	51614	$1.701 \pm 0.003$	$1.703 \pm 0.002$		9.3	7.8
149	150104.94–010727.9	51990	51614	$2.134 \pm 0.001$	$2.138 \pm 0.001$		4.9	3.2
150	145943.03+010601.5	51990	51614	$2.094 \pm 0.002$	$2.097 \pm 0.001$		19.1	15.1
151	145901.28+002123.7	51990	51614	$1.985 \pm 0.002$	$1.990 \pm 0.002$		15.3	12.4
152	145838.04+002418.0	51990	51614	$1.887 \pm 0.002$	$1.882 \pm 0.001$		12.8	9.8
153	145907.19+002401.3	51990	51614	$3.011 \pm 0.001$	$3.012 \pm 0.001$		16.7	12.8
154	145914.50+000648.7	51990	51614	$1.899 \pm 0.002$	$1.898 \pm 0.001$		9.7	7.0
155	150046.92+000427.3	51990	51614	$1.688 \pm 0.002$	$1.688 \pm 0.001$		12.9	6.6
156	150123.45+001940.0	51990	51614	$1.929 \pm 0.002$	$1.929 \pm 0.002$		20.6	17.5
157	150353.21+005837.9	51990	51614	$2.089 \pm 0.002$	$2.091 \pm 0.002$		19.7	15.1
158	150548.40+010801.2	51990	51614	$1.699 \pm 0.002$	$1.697 \pm 0.002$		16.2	12.6
159	150613.10+002854.8	51990	51614	$3.369 \pm 0.001$	$3.359 \pm 0.001$		13.5	10.3
160	150631.75+000518.1	51990	51614	$1.692 \pm 0.003$	$1.691 \pm 0.002$		23.5	16.8
161	150611.23+001823.6	51990	51614	$2.838 \pm 0.001$	$2.806 \pm 0.015$		11.5	9.2
162	131559.71–031852.7	51691	51990	$1.726 \pm 0.002$	$1.731 \pm 0.003$		22.3	17.3
163	131728.74–024759.4	51691	51990	$3.377 \pm 0.001$	$1.430 \pm 0.001$		8.5	9.1
164	131435.50–033035.9	51691	51990	$1.897 \pm 0.001$	$1.895 \pm 0.002$		18.5	17.4
165	131228.04–032308.7	51691	51990	$2.194 \pm 0.002$	$2.195 \pm 0.002$		13.4	13.2
166	130751.67–014119.9	51691	51990	$1.743 \pm 0.002$	$1.738 \pm 0.002$		9.2	9.6
167	131623.99–015834.9	51691	51990	$2.996 \pm 0.003$	$3.004 \pm 0.001$		11.3	10.8
168	171143.95+603634.6	51695	51780	$2.129 \pm 0.002$	$2.131 \pm 0.002$		8.8	9.7
169	171212.37+605328.9	51695	51780	$1.682 \pm 0.003$	$1.684 \pm 0.000$		10.0	10.2
170	171304.62+611945.4	51695	51780	$1.782 \pm 0.002$	$1.783 \pm 0.002$		9.2	9.0
171	171424.68+612404.6	51695	51780	$2.036 \pm 0.001$	$2.042 \pm 0.001$		11.5	11.3
172	171300.19+612354.4	51695	51780	$1.847 \pm 0.001$	$1.845 \pm 0.002$		9.5	9.7
173	170611.38+610052.7	51695	51780	$2.069 \pm 0.002$	$2.055 \pm 0.001$		11.4	10.9
174	170144.60+603300.6	51695	51780	$1.820 \pm 0.002$	$1.821 \pm 0.002$		15.1	13.6

Table 1—Continued

Number	SDSS J	MJD		HSN	$z$	$S/N_r$	
		HSN	LSN			HSN	LSN
175	170102.17+612300.9	51695	51780	$2.287 \pm 0.002$	$2.287 \pm 0.002$	23.2	23.3
176	165755.53+604002.5	51695	51780	$2.332 \pm 0.010$	$2.355 \pm 0.001$	16.6	14.1
177	170306.09+615244.3	51695	51780	$1.916 \pm 0.003$	$1.919 \pm 0.002$	29.1	28.0
178	170954.32+615817.5	51695	51780	$1.847 \pm 0.004$	$1.857 \pm 0.004$	10.1	9.9
179	172909.92+624519.7	51694	51789	$1.748 \pm 0.003$	$1.754 \pm 0.003$	10.7	8.2
180	172047.64+624638.3	51694	51789	$1.831 \pm 0.002$	$1.823 \pm 0.003$	8.9	10.7
181	171633.36+621625.4	51694	51789	$2.118 \pm 0.001$	$2.120 \pm 0.002$	12.7	14.7
182	171731.04+621912.1	51694	51789	$2.119 \pm 0.001$	$2.118 \pm 0.002$	10.8	12.3
183	171420.59+630020.2	51694	51789	$1.709 \pm 0.002$	$1.712 \pm 0.002$	10.7	11.2
184	171015.71+634806.1	51694	51789	$1.786 \pm 0.002$	$1.789 \pm 0.002$	9.2	8.3
185	171535.96+632336.0	51694	51789	$2.182 \pm 0.002$	$2.182 \pm 0.002$	17.3	16.6
186	172026.24+633517.3	51694	51789	$2.149 \pm 0.002$	$2.150 \pm 0.002$	18.3	16.8
187	171712.86+640344.7	51694	51789	$2.105 \pm 0.001$	$2.103 \pm 0.001$	13.4	11.3
188	234336.14–003955.4	51877	51783	$1.781 \pm 0.002$	$1.782 \pm 0.002$	18.6	13.4
189	234033.71–005637.0	51877	51783	$3.650 \pm 0.001$	$3.652 \pm 0.001$	8.7	7.7
190	234002.76–005242.1	51877	51783	$2.256 \pm 0.002$	$2.257 \pm 0.002$	17.1	13.7
191	233838.71+011448.3	51877	51783	$2.078 \pm 0.002$	$2.073 \pm 0.002$	7.3	6.2
192	233930.00+003017.2	51877	51783	$3.052 \pm 0.001$	$3.003 \pm 0.028$	18.4	14.7
193	234340.34+011254.4	51877	51783	$1.952 \pm 0.002$	$1.949 \pm 0.001$	10.1	10.9
194	234500.91+004156.1	51877	51783	$2.193 \pm 0.002$	$2.192 \pm 0.002$	11.6	11.4
195	002609.07–003749.3	51900	51816	$2.382 \pm 0.000$	$2.379 \pm 0.003$	12.4	8.8
196	002322.70–004829.2	51900	51816	$2.251 \pm 0.002$	$2.250 \pm 0.003$	14.6	9.5
197	002139.30–003154.5	51900	51816	$2.157 \pm 0.002$	$2.155 \pm 0.002$	23.8	15.2
198	002146.71–004847.9	51900	51816	$2.502 \pm 0.002$	$2.501 \pm 0.002$	19.6	12.0
199	002028.34–002915.0	51900	51816	$1.927 \pm 0.002$	$1.927 \pm 0.002$	16.6	9.9
200	001950.05–004040.7	51900	51816	$4.327 \pm 0.001$	$4.351 \pm 0.001$	7.5	4.9
201	001657.00+005532.0	51900	51816	$1.756 \pm 0.002$	$1.755 \pm 0.001$	14.7	8.8
202	002143.30+010840.2	51900	51816	$1.901 \pm 0.002$	$1.905 \pm 0.002$	10.7	7.7
203	005102.42–010244.4	51876	51812	$1.874 \pm 0.004$	$1.878 \pm 0.002$	28.6	29.7



Table 1—Continued

Number	SDSS J	MJD		HSN	$z$	$S/N_r$	
		HSN	LSN			HSN	LSN
204	005128.60–002453.9	51876	51812	$1.939 \pm 0.003$	$1.937 \pm 0.002$	15.3	13.5
205	005013.78–002446.4	51876	51812	$2.032 \pm 0.001$	$2.020 \pm 0.003$	9.3	9.0
206	004806.06–010321.5	51876	51812	$2.528 \pm 0.001$	$2.526 \pm 0.002$	20.6	23.4
207	004806.06+004623.4	51876	51812	$2.362 \pm 0.001$	$2.333 \pm 0.016$	10.4	9.5
208	004856.35+005648.1	51876	51812	$2.327 \pm 0.002$	$2.328 \pm 0.002$	22.5	20.3
209	004639.85+000732.1	51876	51812	$2.128 \pm 0.002$	$2.123 \pm 0.002$	15.7	15.0
210	004918.97+002609.4	51876	51812	$1.946 \pm 0.001$	$1.945 \pm 0.002$	24.4	19.4
211	005001.81+002620.1	51876	51812	$1.940 \pm 0.001$	$1.930 \pm 0.003$	10.8	10.3
212	005157.24+000354.8	51876	51812	$1.956 \pm 0.002$	$1.955 \pm 0.002$	30.6	28.0
213	005202.40+010129.2	51876	51812	$2.270 \pm 0.002$	$2.271 \pm 0.002$	35.8	33.3
214	020505.81+011415.9	51812	51877	$2.232 \pm 0.002$	$2.233 \pm 0.002$	11.5	12.1
215	020646.30+010505.5	51812	51877	$2.270 \pm 0.002$	$2.269 \pm 0.003$	14.2	11.9
216	020646.97+001800.5	51812	51877	$1.679 \pm 0.002$	$1.681 \pm 0.002$	13.2	11.8
217	020953.16+005511.0	51812	51877	$2.191 \pm 0.002$	$2.193 \pm 0.002$	14.9	9.6
218	020845.53+002236.0	51812	51877	$1.885 \pm 0.002$	$1.885 \pm 0.002$	32.9	33.8
219	022534.09+000347.9	51817	52238	$1.736 \pm 0.001$	$1.734 \pm 0.002$	4.0	2.8
220	022430.15–004131.1	51817	52238	$1.667 \pm 0.002$	$1.665 \pm 0.001$	10.9	10.7
221	022152.95–003226.1	51817	52238	$1.712 \pm 0.001$	$1.714 \pm 0.002$	9.3	7.7
222	022143.18–001803.8	51817	52238	$2.640 \pm 0.001$	$2.645 \pm 0.001$	14.2	12.0
223	022346.42–003908.2	51817	52238	$1.675 \pm 0.002$	$1.678 \pm 0.002$	11.9	15.3
224	022326.60–010406.7	51817	52238	$1.933 \pm 0.001$	$1.929 \pm 0.002$	9.4	8.2
225	022050.25–002534.5	51817	52238	$1.705 \pm 0.002$	$1.703 \pm 0.002$	4.4	3.4
226	022058.10–002946.8	51817	52238	$1.708 \pm 0.001$	$1.714 \pm 0.001$	6.1	4.3
227	021954.57–000304.5	51817	52238	$1.776 \pm 0.001$	$1.781 \pm 0.002$	3.3	2.5
228	021754.80+000234.0	51817	52238	$2.044 \pm 0.002$	$2.031 \pm 0.001$	5.5	8.4
229	022259.69+011028.3	51817	52238	$1.838 \pm 0.002$	$1.836 \pm 0.002$	8.6	8.0
230	022128.26+002056.1	51817	52238	$2.039 \pm 0.001$	$2.039 \pm 0.001$	10.4	10.3
231	022414.65+011341.8	51817	52238	$1.785 \pm 0.001$	$1.787 \pm 0.001$	4.3	3.5
232	022230.28+001844.5	51817	52238	$2.189 \pm 0.002$	$2.189 \pm 0.001$	9.1	8.5

Table 1—Continued

Number	SDSS J	MJD		HSN	$z$	$S/N_r$	
		HSN	LSN			HSN	LSN
233	022526.15+010124.0	51817	52238	$1.875 \pm 0.002$	$1.870 \pm 0.001$	6.3	3.7
234	022540.44+005720.9	51817	52238	$2.010 \pm 0.002$	$2.011 \pm 0.002$	10.3	9.6
235	022553.60+005130.9	51817	52238	$1.813 \pm 0.002$	$1.814 \pm 0.002$	13.4	12.3
236	022647.42+001254.4	51817	52238	$2.138 \pm 0.001$	$2.156 \pm 0.001$	9.4	8.4
237	022656.06+002248.0	51817	52238	$1.869 \pm 0.001$	$1.863 \pm 0.001$	4.2	4.1
238	030002.70−001219.2	51816	51877	$1.680 \pm 0.002$	$1.676 \pm 0.001$	5.3	5.7
239	025933.72−002517.6	51816	51877	$1.759 \pm 0.001$	$1.760 \pm 0.001$	13.3	13.3
240	025713.07−010157.6	51816	51877	$1.868 \pm 0.002$	$1.872 \pm 0.001$	7.5	6.9
241	025819.32−000806.1	51816	51877	$2.110 \pm 0.002$	$2.108 \pm 0.002$	7.0	6.7
242	025510.55−000712.9	51816	51877	$1.686 \pm 0.002$	$1.692 \pm 0.006$	5.5	5.4
243	025513.03+000639.4	51816	51877	$1.882 \pm 0.000$	$1.880 \pm 0.002$	8.3	8.0
244	025356.07+001057.4	51816	51877	$1.699 \pm 0.002$	$1.700 \pm 0.002$	8.7	8.0
245	025429.74−004334.0	51816	51877	$1.739 \pm 0.002$	$1.742 \pm 0.001$	4.2	3.7
246	025345.20−004706.0	51816	51877	$2.451 \pm 0.001$	$2.431 \pm 0.012$	16.1	15.5
247	025447.40−004111.2	51816	51877	$2.009 \pm 0.003$	$0.678 \pm 0.004$	5.9	5.3
248	025340.94+001110.0	51816	51877	$1.687 \pm 0.001$	$1.687 \pm 0.000$	22.0	19.2
249	025209.80+000548.9	51816	51877	$2.111 \pm 0.002$	$2.114 \pm 0.001$	4.4	4.0
250	025038.67−004739.1	51816	51877	$1.841 \pm 0.001$	$1.841 \pm 0.002$	15.4	17.3
251	025151.27+005739.0	51816	51877	$1.828 \pm 0.003$	$1.829 \pm 0.001$	6.2	6.3
252	025229.76+010049.0	51816	51877	$2.020 \pm 0.002$	$2.009 \pm 0.003$	5.6	5.6
253	025019.27+003100.7	51816	51877	$2.027 \pm 0.002$	$2.014 \pm 0.002$	5.5	4.7
254	025401.44+002916.1	51816	51877	$2.008 \pm 0.002$	$2.010 \pm 0.002$	11.4	11.4
255	025516.88+011134.5	51816	51877	$2.839 \pm 0.003$	$2.848 \pm 0.001$	7.7	7.8
256	025518.58+004847.6	51816	51877	$3.989 \pm 0.003$	$3.987 \pm 0.001$	12.1	10.5
257	025828.99+001526.2	51816	51877	$2.063 \pm 0.002$	$2.053 \pm 0.000$	4.3	4.8
258	025922.63+005829.3	51816	51877	$1.858 \pm 0.002$	$1.861 \pm 0.002$	11.0	12.6
259	030449.86−000813.4	51817	51873	$3.295 \pm 0.002$	$3.295 \pm 0.001$	30.8	30.2
260	030341.04−002321.8	51817	51873	$3.231 \pm 0.001$	$3.232 \pm 0.001$	27.7	27.2
261	030027.11−004848.7	51817	51873	$2.017 \pm 0.001$	$2.017 \pm 0.002$	12.9	12.0

Table 1—Continued

Number	SDSS J	MJD		HSN	$z$	LSN	$S/N_r$	
		HSN	LSN				HSN	LSN
262	025928.52–001959.9	51817	51873	$2.001 \pm 0.002$	$2.001 \pm 0.002$		32.5	31.5
263	030045.25+001656.7	51817	51873	$1.742 \pm 0.002$	$1.744 \pm 0.003$		11.6	11.3
264	025905.64+001121.8	51817	51873	$3.365 \pm 0.002$	$3.365 \pm 0.001$		25.9	24.8
265	030404.46+010327.5	51817	51873	$1.833 \pm 0.002$	$1.835 \pm 0.001$		13.6	13.1
266	030600.41+010145.4	51817	51873	$2.191 \pm 0.001$	$2.190 \pm 0.001$		14.6	10.8
267	030725.90+003709.4	51817	51873	$2.114 \pm 0.002$	$2.122 \pm 0.001$		10.7	7.9
268	031348.33–010433.0	51931	52254	$2.467 \pm 0.002$	$2.469 \pm 0.001$		10.8	10.4
269	031404.43–003947.2	51931	52254	$2.103 \pm 0.002$	$2.105 \pm 0.002$		15.6	15.2
270	031003.01–004645.7	51931	52254	$2.113 \pm 0.002$	$2.114 \pm 0.001$		26.4	24.3
271	031028.87–005326.2	51931	52254	$2.462 \pm 0.001$	$2.469 \pm 0.001$		19.7	18.4
272	030719.92+004538.7	51931	52254	$1.906 \pm 0.001$	$1.904 \pm 0.002$		9.8	7.9
273	031127.55+005357.3	51931	52254	$1.758 \pm 0.002$	$1.762 \pm 0.001$		11.4	8.9
274	031237.57+004511.2	51931	52254	$1.823 \pm 0.001$	$1.823 \pm 0.002$		8.4	8.0
275	032158.90–010037.6	51929	51821	$1.761 \pm 0.001$	$1.763 \pm 0.002$		6.3	5.3
276	032253.09–001121.6	51929	51821	$1.879 \pm 0.002$	$1.875 \pm 0.002$		2.9	3.7
277	032158.40–001102.6	51929	51821	$2.153 \pm 0.002$	$2.152 \pm 0.002$		12.4	12.0
278	032028.36–003255.4	51929	51821	$1.799 \pm 0.002$	$1.794 \pm 0.002$		2.4	2.3
279	031845.17–001845.3	51929	51821	$3.223 \pm 0.002$	$3.231 \pm 0.003$		13.5	12.1
280	031441.46–000319.7	51929	51821	$2.123 \pm 0.002$	$2.121 \pm 0.002$		16.6	14.0
281	031609.84+004043.2	51929	51821	$2.920 \pm 0.001$	$2.917 \pm 0.001$		15.3	13.0
282	031544.54+004220.9	51929	51821	$1.880 \pm 0.001$	$1.883 \pm 0.002$		10.4	7.8
283	031731.99+001010.4	51929	51821	$1.959 \pm 0.002$	$1.951 \pm 0.002$		7.4	8.3
284	031805.30+001735.9	51929	51821	$1.777 \pm 0.002$	$1.776 \pm 0.002$		4.2	4.7
285	032022.76+004108.3	51929	51821	$1.787 \pm 0.002$	$1.784 \pm 0.002$		20.5	22.0
286	031949.59+005520.5	51929	51821	$2.039 \pm 0.001$	$2.042 \pm 0.002$		9.5	11.3
287	033931.23–002458.7	51810	51879	$1.667 \pm 0.002$	$1.664 \pm 0.002$		12.3	10.2
288	033335.03–004926.9	51810	51879	$1.774 \pm 0.001$	$1.777 \pm 0.001$		11.2	10.2
289	033523.31–002203.9	51810	51879	$1.768 \pm 0.002$	$1.769 \pm 0.002$		22.5	20.6
290	033356.92–003122.9	51810	51879	$1.866 \pm 0.001$	$1.867 \pm 0.001$		12.9	11.4

Table 1—Continued

Number	SDSS J	MJD		HSN	$z$	$S/N_r$	
		HSN	LSN			HSN	LSN
291	033334.73–001621.4	51810	51879	$1.826 \pm 0.002$	$1.822 \pm 0.002$	5.3	5.0
292	033201.41–004310.2	51810	51879	$1.744 \pm 0.002$	$1.742 \pm 0.001$	7.9	7.8
293	033131.17–005704.2	51810	51879	$1.805 \pm 0.002$	$1.805 \pm 0.002$	15.4	14.2
294	032933.97–004801.1	51810	51879	$1.878 \pm 0.000$	$1.880 \pm 0.001$	12.9	11.5
295	032941.12–002246.6	51810	51879	$2.416 \pm 0.001$	$2.413 \pm 0.001$	4.8	4.4
296	033004.34+000901.6	51810	51879	$1.797 \pm 0.001$	$1.799 \pm 0.002$	8.9	8.4
297	033351.52+002341.6	51810	51879	$1.814 \pm 0.001$	$1.814 \pm 0.001$	10.7	10.3
298	033310.29+000321.6	51810	51879	$1.727 \pm 0.002$	$1.728 \pm 0.001$	5.0	4.1
299	033546.44+011622.4	51810	51879	$2.092 \pm 0.002$	$2.092 \pm 0.002$	8.5	7.1
300	033515.59+002900.8	51810	51879	$2.241 \pm 0.002$	$2.238 \pm 0.001$	19.2	18.8
301	033934.74+002302.8	51810	51879	$1.732 \pm 0.002$	$1.730 \pm 0.002$	9.0	7.7
302	034435.96–001527.5	51811	51885	$2.345 \pm 0.002$	$2.344 \pm 0.002$	10.9	9.3
303	034329.63–010838.9	51811	51885	$1.726 \pm 0.002$	$1.727 \pm 0.002$	18.5	16.8
304	034318.37–004447.9	51811	51885	$1.748 \pm 0.002$	$1.752 \pm 0.002$	2.9	1.5
305	034247.24–004129.6	51811	51885	$2.226 \pm 0.001$	$2.224 \pm 0.002$	5.5	3.7
306	033954.26–002055.0	51811	51885	$2.320 \pm 0.001$	$2.319 \pm 0.001$	10.2	9.2
307	034002.84–000627.9	51811	51885	$1.720 \pm 0.002$	$1.719 \pm 0.001$	8.1	7.0
308	033854.77–000520.9	51811	51885	$3.050 \pm 0.002$	$3.051 \pm 0.001$	16.6	19.0
309	033931.23–002458.7	51811	51885	$1.669 \pm 0.002$	$1.669 \pm 0.001$	13.6	12.0
310	033708.45–000614.3	51811	51885	$1.660 \pm 0.001$	$1.658 \pm 0.002$	10.5	8.1
311	033832.65+004518.5	51811	51885	$1.839 \pm 0.002$	$1.836 \pm 0.001$	8.8	8.1
312	033639.50+002535.3	51811	51885	$1.679 \pm 0.003$	$1.682 \pm 0.002$	7.1	6.0
313	034111.09+011617.9	51811	51885	$1.840 \pm 0.005$	$1.835 \pm 0.002$	7.6	5.7
314	034119.57+010136.2	51811	51885	$2.081 \pm 0.002$	$1.503 \pm 0.002$	5.4	3.9
315	034023.49+003111.9	51811	51885	$1.910 \pm 0.001$	$1.904 \pm 0.001$	6.7	5.9
316	034027.31+003441.6	51811	51885	$1.875 \pm 0.001$	$1.875 \pm 0.002$	31.5	33.4
317	033934.74+002302.8	51811	51885	$1.732 \pm 0.001$	$1.733 \pm 0.004$	10.5	8.8
318	034143.88+000355.6	51811	51885	$1.697 \pm 0.001$	$1.692 \pm 0.002$	7.8	6.3
319	034403.48+003426.9	51811	51885	$2.046 \pm 0.001$	$2.041 \pm 0.000$	9.8	7.4

Table 1—Continued

Number	SDSS J	MJD		HSN	$z$	$S/N_r$	
		HSN	LSN			HSN	LSN
320	034501.37+000638.9	51811	51885	$1.670 \pm 0.002$	$1.667 \pm 0.002$	13.6	11.4
321	004023.76+140807.4	51817	51884	$1.870 \pm 0.001$	$1.869 \pm 0.002$	38.4	50.4
322	003453.74+141856.1	51817	51884	$1.679 \pm 0.001$	$1.679 \pm 0.001$	4.4	4.3
323	003418.65+145102.8	51817	51884	$2.114 \pm 0.002$	$2.113 \pm 0.001$	8.5	7.8
324	003520.91+143730.2	51817	51884	$1.857 \pm 0.002$	$1.860 \pm 0.001$	4.8	3.2
325	003240.57+143951.9	51817	51884	$1.864 \pm 0.002$	$1.865 \pm 0.001$	4.0	3.0
326	003230.37+145248.0	51817	51884	$1.688 \pm 0.001$	$1.681 \pm 0.001$	7.8	6.6
327	005010.32+142947.4	51868	51812	$2.042 \pm 0.001$	$2.042 \pm 0.002$	7.2	6.3
328	004721.96+140706.3	51868	51812	$1.741 \pm 0.001$	$1.737 \pm 0.002$	7.8	6.5
329	004833.54+142056.8	51868	51812	$1.819 \pm 0.002$	$1.816 \pm 0.001$	10.7	10.3
330	004710.84+145715.5	51868	51812	$2.298 \pm 0.010$	$2.296 \pm 0.001$	4.9	5.4
331	004736.10+145256.4	51868	51812	$1.845 \pm 0.003$	$1.846 \pm 0.002$	7.4	6.8
332	004455.68+134831.4	51868	51812	$2.225 \pm 0.002$	$2.226 \pm 0.002$	5.8	5.5
333	004516.62+141811.4	51868	51812	$2.122 \pm 0.002$	$2.119 \pm 0.001$	7.9	7.8
334	004238.23+135054.8	51868	51812	$1.771 \pm 0.001$	$1.773 \pm 0.002$	6.2	4.8
335	004241.29+134241.1	51868	51812	$1.786 \pm 0.002$	$1.785 \pm 0.002$	12.0	10.8
336	004103.71+144518.9	51868	51812	$1.767 \pm 0.002$	$1.765 \pm 0.001$	6.9	6.2
337	004112.64+140534.0	51868	51812	$2.093 \pm 0.001$	$2.108 \pm 0.001$	3.7	3.0
338	003955.81+153357.3	51868	51812	$1.770 \pm 0.002$	$1.770 \pm 0.002$	11.7	11.6
339	004105.97+150512.4	51868	51812	$2.281 \pm 0.003$	$2.283 \pm 0.002$	4.7	3.9
340	004403.47+151200.0	51868	51812	$1.781 \pm 0.002$	$1.780 \pm 0.002$	13.2	13.1
341	004417.55+153257.1	51868	51812	$2.065 \pm 0.002$	$2.062 \pm 0.002$	9.8	9.8
342	004609.30+160335.1	51868	51812	$1.829 \pm 0.004$	$1.829 \pm 0.001$	3.2	3.6
343	004637.04+154652.4	51868	51812	$1.767 \pm 0.002$	$1.765 \pm 0.002$	3.3	3.5
344	004742.39+155937.5	51868	51812	$1.832 \pm 0.001$	$1.835 \pm 0.002$	7.2	7.2
345	004928.39+152859.1	51868	51812	$2.201 \pm 0.003$	$2.198 \pm 0.003$	6.9	6.7
346	010838.82+140428.4	51811	51878	$1.706 \pm 0.002$	$1.700 \pm 0.001$	17.7	16.9
347	010826.27+142939.6	51811	51878	$1.755 \pm 0.001$	$1.755 \pm 0.002$	11.4	10.9
348	010823.77+141450.0	51811	51878	$2.258 \pm 0.001$	$2.259 \pm 0.002$	14.4	13.7

Table 1—Continued

Number	SDSS J	MJD		HSN	$z$	LSN	$S/N_r$	
		HSN	LSN				HSN	LSN
349	010531.94+135548.8	51811	51878	$1.791 \pm 0.002$		$1.788 \pm 0.002$	13.4	11.6
350	010725.09+153900.0	51811	51878	$1.763 \pm 0.001$		$1.761 \pm 0.001$	9.6	14.1
351	010931.40+144729.1	51811	51878	$2.066 \pm 0.002$		$2.064 \pm 0.001$	14.7	13.7
352	011036.55+145737.6	51811	51878	$1.693 \pm 0.002$		$1.694 \pm 0.002$	13.4	12.6
353	011309.05+153553.7	51811	51878	$1.807 \pm 0.002$		$1.807 \pm 0.002$	19.5	19.3
354	094012.22−004627.1	52314	52027	$2.343 \pm 0.003$		$2.328 \pm 0.006$	9.8	6.9
355	093759.81−004051.3	52314	52027	$2.066 \pm 0.002$		$2.067 \pm 0.001$	4.8	4.6
356	093805.41−000637.5	52314	52027	$2.098 \pm 0.002$		$2.104 \pm 0.002$	7.7	6.4
357	093622.06−004555.4	52314	52027	$1.776 \pm 0.002$		$1.778 \pm 0.002$	3.3	2.7
358	093736.74−000732.1	52314	52027	$1.789 \pm 0.002$		$1.791 \pm 0.002$	8.3	5.1
359	093715.35−002106.7	52314	52027	$3.125 \pm 0.002$		$3.114 \pm 0.001$	2.6	1.9
360	093547.44−001541.4	52314	52027	$1.949 \pm 0.002$		$0.648 \pm 0.002$	3.1	2.9
361	093355.09−004109.8	52314	52027	$1.677 \pm 0.001$		$1.679 \pm 0.002$	5.9	5.1
362	093423.78−003015.3	52314	52027	$1.941 \pm 0.002$		$1.937 \pm 0.002$	10.3	10.5
363	093233.65−003441.9	52314	52027	$1.836 \pm 0.002$		$1.838 \pm 0.002$	4.1	2.8
364	093308.64−000834.1	52314	52027	$2.543 \pm 0.002$		$2.550 \pm 0.001$	8.6	7.0
365	093150.57−001935.2	52314	52027	$1.839 \pm 0.002$		$1.836 \pm 0.002$	8.8	8.3
366	093129.00+000825.2	52314	52027	$2.020 \pm 0.002$		$2.003 \pm 0.005$	6.6	5.7
367	093411.51+002952.1	52314	52027	$1.907 \pm 0.002$		$1.916 \pm 0.002$	14.7	12.0
368	093450.69+004716.0	52314	52027	$2.210 \pm 0.002$		$2.211 \pm 0.002$	14.1	12.9
369	093551.20+002333.0	52314	52027	$1.758 \pm 0.002$		$1.756 \pm 0.002$	3.6	3.0
370	093556.91+002255.6	52314	52027	$3.750 \pm 0.001$		$3.754 \pm 0.001$	15.2	12.5
371	093716.63+001824.4	52314	52027	$1.673 \pm 0.002$		$1.680 \pm 0.002$	7.4	6.3
372	093846.09+010130.1	52314	52027	$1.896 \pm 0.002$		$1.909 \pm 0.001$	5.9	5.1
373	094026.17−000131.7	52314	52027	$1.983 \pm 0.002$		$1.014 \pm 0.002$	7.7	7.5
374	094149.60+003254.3	52314	52027	$2.003 \pm 0.002$		$2.003 \pm 0.003$	3.1	3.5
375	131615.03+012449.0	52295	52029	$1.734 \pm 0.000$		$1.732 \pm 0.001$	8.4	6.9
376	131712.01+020225.0	52295	52029	$2.155 \pm 0.002$		$2.159 \pm 0.002$	7.6	6.5
377	131545.73+020505.1	52295	52029	$2.247 \pm 0.002$		$2.247 \pm 0.002$	12.3	9.3

Table 1—Continued

Number	SDSS J	MJD		HSN	$z$	$S/N_r$	
		HSN	LSN			HSN	LSN
378	131349.47+012051.2	52295	52029	$1.940 \pm 0.003$	$1.941 \pm 0.002$	18.0	13.1
379	131439.23+021214.9	52295	52029	$1.776 \pm 0.001$	$1.776 \pm 0.002$	6.3	5.7
380	131215.80+021432.1	52295	52029	$1.674 \pm 0.002$	$1.678 \pm 0.003$	11.1	7.6
381	131040.74+020127.0	52295	52029	$1.827 \pm 0.002$	$1.828 \pm 0.002$	12.5	7.8
382	130754.43+021820.2	52295	52029	$1.868 \pm 0.002$	$1.862 \pm 0.002$	7.9	4.4
383	130855.25+030614.2	52295	52029	$1.785 \pm 0.002$	$1.783 \pm 0.002$	9.8	7.7
384	130848.84+024308.9	52295	52029	$2.100 \pm 0.002$	$2.101 \pm 0.002$	8.5	5.6
385	130825.64+025736.0	52295	52029	$1.754 \pm 0.002$	$1.755 \pm 0.002$	10.9	4.3
386	131228.34+033758.6	52295	52029	$2.014 \pm 0.004$	$2.003 \pm 0.003$	8.9	6.3
387	131404.91+024959.1	52295	52029	$1.948 \pm 0.003$	$1.948 \pm 0.001$	11.9	8.3
388	082050.72+431146.1	52207	51959	$2.496 \pm 0.002$	$2.497 \pm 0.001$	10.0	7.2
389	082033.97+432751.8	52207	51959	$2.407 \pm 0.003$	$2.404 \pm 0.002$	22.2	14.4
390	081647.23+432921.8	52207	51959	$1.851 \pm 0.002$	$1.848 \pm 0.002$	6.1	4.9
391	081152.56+434051.2	52207	51959	$2.184 \pm 0.003$	$2.187 \pm 0.002$	12.7	8.4
392	081348.96+440901.9	52207	51959	$2.280 \pm 0.002$	$2.275 \pm 0.002$	8.6	7.5
393	081349.02+441517.7	52207	51959	$2.215 \pm 0.002$	$2.210 \pm 0.002$	13.6	11.4
394	081241.12+442129.0	52207	51959	$4.350 \pm 0.001$	$4.353 \pm 0.001$	7.7	6.1
395	081752.07+450728.6	52207	51959	$2.037 \pm 0.002$	$2.039 \pm 0.002$	16.6	13.6
396	081743.90+444931.7	52207	51959	$1.663 \pm 0.002$	$1.660 \pm 0.002$	17.0	14.0
397	081810.03+443148.8	52207	51959	$3.877 \pm 0.001$	$3.863 \pm 0.001$	11.6	8.8
398	081614.97+435640.2	52207	51959	$1.958 \pm 0.100$	$1.957 \pm 0.002$	5.2	4.8
399	081926.52+445759.9	52207	51959	$1.713 \pm 0.002$	$1.708 \pm 0.002$	9.3	6.8
400	081931.48+450801.5	52207	51959	$1.872 \pm 0.001$	$1.871 \pm 0.002$	18.0	14.9
401	081845.12+441211.2	52207	51959	$2.282 \pm 0.000$	$2.282 \pm 0.002$	10.0	7.4
402	082049.80+440736.3	52207	51959	$1.850 \pm 0.002$	$1.854 \pm 0.002$	12.0	9.6
403	082059.16+442820.4	52207	51959	$1.931 \pm 0.001$	$1.932 \pm 0.002$	8.0	6.2
404	082310.94+442048.1	52207	51959	$1.780 \pm 0.002$	$1.781 \pm 0.002$	13.9	12.6
405	082140.54+445609.3	52207	51959	$2.115 \pm 0.002$	$2.114 \pm 0.004$	12.6	10.3
406	082418.40+441256.9	52207	51959	$1.673 \pm 0.002$	$1.674 \pm 0.002$	8.5	7.6

Table 1—Continued

Number	SDSS J	MJD		HSN	$z$	$S/N_r$	
		HSN	LSN			HSN	LSN
407	082501.99+435338.4	52207	51959	$1.903 \pm 0.002$	$1.903 \pm 0.002$	12.8	14.1
408	154400.16+531903.3	52374	52442	$2.975 \pm 0.001$	$2.945 \pm 0.006$	23.6	17.6
409	154358.50+532125.6	52374	52442	$1.656 \pm 0.002$	$1.662 \pm 0.002$	13.0	9.4
410	154401.17+534049.3	52374	52442	$2.290 \pm 0.002$	$2.294 \pm 0.002$	8.9	7.8
411	154359.44+535903.1	52374	52442	$2.370 \pm 0.002$	$2.350 \pm 0.014$	33.7	32.9
412	154125.46+534812.9	52374	52442	$2.543 \pm 0.002$	$2.526 \pm 0.006$	12.4	10.6
413	154025.43+535129.9	52374	52442	$1.831 \pm 0.002$	$1.835 \pm 0.002$	11.2	9.9
414	154012.56+531145.7	52374	52442	$1.757 \pm 0.001$	$1.763 \pm 0.002$	6.8	4.8
415	154102.52+530048.1	52374	52442	$2.565 \pm 0.001$	$2.565 \pm 0.001$	17.3	12.0
416	153925.02+532439.5	52374	52442	$3.168 \pm 0.002$	$3.187 \pm 0.001$	4.0	2.8
417	153527.89+534014.4	52374	52442	$1.650 \pm 0.002$	$1.646 \pm 0.002$	7.5	6.0
418	153501.74+534626.5	52374	52442	$1.796 \pm 0.001$	$1.793 \pm 0.002$	17.1	15.5
419	153727.20+531619.7	52374	52442	$1.885 \pm 0.002$	$1.885 \pm 0.002$	10.2	6.5
420	153215.89+535416.4	52374	52442	$1.795 \pm 0.002$	$1.797 \pm 0.002$	15.1	11.3
421	153001.69+540452.3	52374	52442	$1.721 \pm 0.001$	$1.719 \pm 0.002$	13.7	8.7
422	153658.76+550040.3	52374	52442	$1.940 \pm 0.002$	$1.940 \pm 0.002$	16.6	11.2
423	153417.95+541252.5	52374	52442	$3.136 \pm 0.002$	$3.135 \pm 0.001$	9.6	7.6
424	153737.59+541228.5	52374	52442	$1.661 \pm 0.002$	$1.658 \pm 0.002$	9.2	7.9
425	153943.87+543546.9	52374	52442	$1.659 \pm 0.002$	$1.657 \pm 0.002$	12.1	10.0
426	154052.43+551104.7	52374	52442	$1.924 \pm 0.002$	$1.924 \pm 0.001$	12.1	9.1
427	154253.86+551225.1	52374	52442	$2.188 \pm 0.002$	$2.190 \pm 0.002$	12.5	9.2
428	160127.66+505807.0	52375	52081	$2.383 \pm 0.001$	$2.409 \pm 0.002$	9.8	4.9
429	160202.11+495904.3	52375	52081	$2.024 \pm 0.001$	$2.020 \pm 0.002$	17.6	9.1
430	160252.65+493914.5	52375	52081	$1.795 \pm 0.001$	$1.790 \pm 0.002$	13.6	7.9
431	155502.30+502531.3	52375	52081	$1.794 \pm 0.001$	$1.793 \pm 0.002$	15.1	8.5
432	155623.63+502255.0	52375	52081	$1.776 \pm 0.002$	$1.772 \pm 0.002$	6.8	3.9
433	155640.99+502139.4	52375	52081	$1.865 \pm 0.001$	$1.855 \pm 0.001$	11.3	5.4
434	155818.88+514536.0	52375	52081	$2.318 \pm 0.002$	$2.329 \pm 0.002$	13.2	5.7
435	155704.97+514435.4	52375	52081	$3.757 \pm 0.001$	$3.754 \pm 0.001$	4.0	2.3



Table 1—Continued

Number	SDSS J	MJD		HSN	$z$	$S/N_r$	
		HSN	LSN			HSN	LSN
436	155917.35+520244.9	52375	52081	$3.042 \pm 0.002$	$3.042 \pm 0.001$	10.5	4.9
437	155922.10+515104.5	52375	52081	$1.860 \pm 0.003$	$1.862 \pm 0.002$	13.0	5.3
438	160126.32+511038.1	52375	52081	$1.844 \pm 0.002$	$1.847 \pm 0.002$	9.5	3.7
439	160547.59+511330.2	52375	52081	$1.785 \pm 0.002$	$1.782 \pm 0.001$	8.0	3.6
440	160247.40+514417.9	52375	52081	$1.948 \pm 0.001$	$1.939 \pm 0.005$	8.7	4.6
441	160529.50+515900.6	52375	52081	$1.656 \pm 0.002$	$1.658 \pm 0.002$	11.4	4.8
442	231040.97–010823.0	52884	52534	$2.065 \pm 0.001$	$2.066 \pm 0.001$	8.7	7.2
443	231209.93–005658.7	52884	52534	$2.989 \pm 0.001$	$2.990 \pm 0.001$	6.3	4.5
444	231242.98–005244.5	52884	52534	$2.192 \pm 0.002$	$2.189 \pm 0.002$	6.6	4.9
445	231312.07–001657.9	52884	52534	$3.791 \pm 0.002$	$3.825 \pm 0.000$	4.4	2.7
446	230952.29–003138.9	52884	52534	$3.975 \pm 0.003$	$3.975 \pm 0.000$	6.7	4.5
447	230745.01–005122.8	52884	52534	$1.841 \pm 0.005$	$1.838 \pm 0.001$	5.1	3.4
448	230745.15–004542.6	52884	52534	$1.841 \pm 0.001$	$1.838 \pm 0.003$	11.4	8.1
449	230638.25–010700.2	52884	52534	$2.313 \pm 0.001$	$2.296 \pm 0.005$	11.3	9.1
450	230504.46–010451.3	52884	52534	$2.023 \pm 0.001$	$1.052 \pm 0.003$	6.0	3.9
451	230437.65–005703.3	52884	52534	$2.492 \pm 0.001$	$2.503 \pm 0.001$	5.8	4.5
452	230402.78–003855.4	52884	52534	$2.773 \pm 0.001$	$2.771 \pm 0.001$	3.3	2.4
453	230424.87–010140.8	52884	52534	$1.890 \pm 0.001$	$1.886 \pm 0.000$	3.0	2.6
454	230228.94+002249.1	52884	52534	$1.694 \pm 0.002$	$1.694 \pm 0.002$	14.2	11.6
455	230239.68+002702.5	52884	52534	$1.864 \pm 0.001$	$1.857 \pm 0.004$	3.1	3.1
456	230524.46+005209.7	52884	52534	$1.846 \pm 0.002$	$1.844 \pm 0.001$	6.5	2.7
457	230323.77+001615.1	52884	52534	$3.691 \pm 0.001$	$3.688 \pm 0.001$	4.3	3.6
458	230435.93+003001.5	52884	52534	$2.002 \pm 0.001$	$0.676 \pm 0.003$	3.4	2.8
459	230441.51+003307.2	52884	52534	$3.326 \pm 0.002$	$3.323 \pm 0.001$	6.1	3.8
460	230603.79+000319.7	52884	52534	$1.813 \pm 0.002$	$1.811 \pm 0.002$	3.8	2.9
461	230524.30+003034.0	52884	52534	$1.755 \pm 0.002$	$1.756 \pm 0.001$	15.0	9.7
462	230724.97+000957.8	52884	52534	$1.898 \pm 0.001$	$1.897 \pm 0.001$	9.0	6.7
463	230839.94+010548.4	52884	52534	$1.745 \pm 0.002$	$1.745 \pm 0.002$	6.2	4.5
464	230936.87+005215.5	52884	52534	$2.221 \pm 0.001$	$2.221 \pm 0.002$	9.0	7.0

Table 1—Continued

Number	SDSS J	MJD		HSN	$z$	$S/N_r$	
		HSN	LSN			HSN	LSN
465	230959.52+005537.4	52884	52534	$2.401 \pm 0.001$	$2.400 \pm 0.004$	18.0	14.3
466	230957.65−000127.2	52884	52534	$2.110 \pm 0.002$	$2.117 \pm 0.002$	5.0	3.7
467	231055.32+004817.2	52884	52534	$2.994 \pm 0.002$	$2.994 \pm 0.001$	14.1	8.4
468	231121.98+004959.7	52884	52534	$2.063 \pm 0.002$	$2.063 \pm 0.001$	10.4	5.6
469	231147.89+002941.9	52884	52534	$1.901 \pm 0.001$	$1.901 \pm 0.001$	9.5	7.1
470	231241.77+002450.3	52884	52534	$1.893 \pm 0.002$	$1.885 \pm 0.004$	15.9	7.7
471	224408.50+123315.5	52520	52264	$2.145 \pm 0.001$	$2.148 \pm 0.001$	18.7	7.3
472	224145.11+122557.1	52520	52264	$2.630 \pm 0.003$	$2.614 \pm 0.006$	24.5	11.3
473	223619.19+132620.3	52520	52264	$3.296 \pm 0.003$	$3.280 \pm 0.005$	18.2	6.8
474	223536.42+125724.8	52520	52264	$2.066 \pm 0.001$	$2.054 \pm 0.002$	8.1	3.0
475	223809.92+140409.9	52520	52264	$2.223 \pm 0.002$	$2.221 \pm 0.002$	13.5	5.5
476	223848.23+133926.8	52520	52264	$2.228 \pm 0.002$	$2.227 \pm 0.002$	12.2	5.2
477	223843.99+140226.9	52520	52264	$2.003 \pm 0.001$	$1.990 \pm 0.003$	11.8	3.8
478	224005.09+143147.8	52520	52264	$3.491 \pm 0.002$	$3.508 \pm 0.000$	4.7	1.1
479	224101.41+144334.5	52520	52264	$1.699 \pm 0.002$	$1.701 \pm 0.002$	13.3	4.5
480	075153.67+331319.8	52237	52577	$1.928 \pm 0.003$	$1.932 \pm 0.002$	13.9	7.6
481	075217.23+335524.5	52237	52577	$1.683 \pm 0.003$	$1.682 \pm 0.001$	5.8	5.1
482	075225.59+334310.0	52237	52577	$1.728 \pm 0.005$	$1.725 \pm 0.002$	12.0	13.2
483	075118.29+323704.3	52237	52577	$2.152 \pm 0.002$	$2.155 \pm 0.002$	9.3	10.2
484	075149.83+335517.2	52237	52577	$2.054 \pm 0.001$	$2.065 \pm 0.002$	3.5	4.1
485	075044.04+340658.4	52237	52577	$2.145 \pm 3.900$	$2.146 \pm 0.002$	24.6	22.0
486	074902.48+340108.2	52237	52577	$1.763 \pm 0.001$	$1.758 \pm 0.002$	10.5	10.0
487	074758.66+335432.5	52237	52577	$1.689 \pm 0.002$	$1.700 \pm 0.001$	6.3	9.2
488	074823.86+332051.2	52237	52577	$2.988 \pm 0.002$	$2.989 \pm 0.001$	6.3	9.1
489	074701.96+332213.1	52237	52577	$2.167 \pm 0.001$	$2.164 \pm 0.001$	7.8	8.4
490	074851.16+343359.1	52237	52577	$3.312 \pm 0.002$	$3.330 \pm 0.001$	13.4	13.4
491	075133.67+341906.0	52237	52577	$1.942 \pm 0.001$	$1.939 \pm 0.002$	17.8	17.6
492	075218.49+352815.5	52237	52577	$1.727 \pm 0.002$	$1.727 \pm 0.002$	12.0	11.3
493	075412.60+343625.7	52237	52577	$1.754 \pm 0.001$	$1.757 \pm 0.001$	9.7	9.3

Table 1—Continued

Number	SDSS J	MJD		HSN	$z$	$S/N_r$	
		HSN	LSN			HSN	LSN
494	075321.93+350733.6	52237	52577	$1.895 \pm 0.002$	$1.907 \pm 0.001$	3.8	5.0
495	075524.11+342134.5	52237	52577	$2.125 \pm 0.001$	$2.126 \pm 0.002$	33.4	29.8
496	075430.58+345521.8	52237	52577	$1.777 \pm 0.002$	$1.778 \pm 0.002$	9.1	9.6
497	075813.28+343828.6	52237	52577	$2.258 \pm 0.001$	$2.257 \pm 0.002$	13.5	13.5
498	075639.17+350315.9	52237	52577	$2.051 \pm 0.002$	$2.040 \pm 0.001$	5.7	4.3
499	144405.65+571444.8	52346	52433	$1.800 \pm 0.002$	$1.793 \pm 0.002$	16.1	11.1
500	144439.83+573119.7	52346	52433	$1.994 \pm 0.002$	$0.671 \pm 0.001$	6.5	3.4
501	143934.15+570110.1	52346	52433	$2.035 \pm 0.002$	$2.041 \pm 0.001$	8.5	5.9
502	143959.46+572717.1	52346	52433	$1.786 \pm 0.001$	$1.785 \pm 0.002$	5.8	4.9
503	144013.62+573336.3	52346	52433	$1.713 \pm 0.001$	$1.717 \pm 0.003$	9.1	7.1
504	144059.16+573724.3	52346	52433	$2.041 \pm 0.002$	$2.040 \pm 0.002$	6.0	5.7
505	143624.07+564909.2	52346	52433	$2.106 \pm 0.002$	$2.110 \pm 0.001$	17.0	14.5
506	143124.31+572803.5	52346	52433	$2.066 \pm 0.002$	$2.066 \pm 0.001$	16.3	14.3
507	143118.11+572428.6	52346	52433	$3.243 \pm 0.008$	$3.253 \pm 0.001$	13.1	11.7
508	143252.46+564847.7	52346	52433	$2.034 \pm 0.001$	$2.037 \pm 0.001$	14.8	12.4
509	143125.24+565858.5	52346	52433	$2.044 \pm 0.001$	$2.062 \pm 0.000$	6.8	5.5
510	143200.72+570526.0	52346	52433	$2.192 \pm 0.001$	$2.192 \pm 0.002$	6.9	4.9
511	142451.40+574540.6	52346	52433	$2.811 \pm 0.002$	$2.815 \pm 0.001$	11.1	8.2
512	143325.24+583455.3	52346	52433	$1.833 \pm 0.007$	$1.834 \pm 0.002$	7.7	6.0
513	143602.15+591459.4	52346	52433	$1.767 \pm 0.000$	$1.763 \pm 0.002$	11.9	10.8
514	143807.63+580701.0	52346	52433	$1.999 \pm 0.001$	$1.989 \pm 0.002$	8.8	5.9
515	143848.90+584909.4	52346	52433	$1.792 \pm 0.002$	$1.796 \pm 0.002$	4.9	3.9
516	143838.86+584004.1	52346	52433	$1.996 \pm 0.000$	$1.996 \pm 0.002$	8.5	6.5
517	144034.18+580351.7	52346	52433	$1.680 \pm 0.001$	$1.679 \pm 0.001$	14.7	9.4
518	145316.61+560750.8	52347	52435	$1.847 \pm 0.001$	$1.842 \pm 0.001$	2.6	2.5
519	145158.79+560515.1	52347	52435	$2.225 \pm 0.001$	$2.225 \pm 0.002$	8.9	9.9
520	145028.76+561901.7	52347	52435	$1.784 \pm 0.001$	$1.785 \pm 0.002$	10.1	11.6
521	144346.27+564545.8	52347	52435	$2.772 \pm 0.001$	$2.732 \pm 0.020$	7.1	7.3
522	144255.80+563138.5	52347	52435	$2.099 \pm 0.001$	$2.094 \pm 0.002$	6.5	6.3

Table 1—Continued

Number	SDSS J	MJD		HSN	$z$	$S/N_r$	
		HSN	LSN			HSN	LSN
523	144306.67+563112.7	52347	52435	$2.464 \pm 0.002$	$2.463 \pm 0.001$	14.0	13.4
524	144408.38+570445.8	52347	52435	$1.890 \pm 0.001$	$1.887 \pm 0.001$	4.6	5.6
525	144641.21+571040.6	52347	52435	$2.105 \pm 0.001$	$2.107 \pm 0.002$	9.1	9.4
526	144621.41+570041.6	52347	52435	$1.861 \pm 0.002$	$1.862 \pm 0.002$	13.2	14.5
527	144918.17+574953.6	52347	52435	$1.983 \pm 0.002$	$1.995 \pm 0.002$	10.9	12.9
528	033356.92–003122.9	52672	52326	$1.865 \pm 0.002$	$1.866 \pm 0.002$	19.0	13.3
529	033523.31–002203.9	52672	52326	$1.768 \pm 0.001$	$1.767 \pm 0.002$	25.9	20.2
530	032933.97–004801.1	52672	52326	$1.877 \pm 0.001$	$1.878 \pm 0.001$	12.1	10.4
531	033351.52+002341.6	52672	52326	$1.818 \pm 0.002$	$1.817 \pm 0.002$	15.3	11.9
532	162034.40+441756.0	52443	52355	$1.783 \pm 0.002$	$1.786 \pm 0.002$	9.0	4.2
533	161801.99+441219.0	52443	52355	$2.073 \pm 0.002$	$2.078 \pm 0.001$	12.2	5.3
534	161354.18+444129.0	52443	52355	$1.860 \pm 0.002$	$1.861 \pm 0.003$	6.2	3.0
535	161354.47+445245.6	52443	52355	$2.681 \pm 0.002$	$2.690 \pm 0.001$	12.6	5.7
536	161141.44+443707.3	52443	52355	$1.676 \pm 0.003$	$1.672 \pm 0.002$	10.0	4.7
537	161137.22+443024.5	52443	52355	$1.682 \pm 0.002$	$1.678 \pm 0.000$	7.7	2.9
538	161115.13+443909.6	52443	52355	$2.028 \pm 0.001$	$1.014 \pm 0.001$	4.0	1.4
539	161240.98+435749.3	52443	52355	$1.741 \pm 0.001$	$1.766 \pm 0.001$	4.0	0.7
540	161003.54+442353.7	52443	52355	$2.600 \pm 0.003$	$2.581 \pm 0.006$	18.8	8.5
541	160851.52+460352.5	52443	52355	$1.774 \pm 0.001$	$1.775 \pm 0.001$	13.5	5.3
542	161253.92+451341.5	52443	52355	$2.256 \pm 0.002$	$2.260 \pm 0.001$	10.3	5.5
543	161958.24+452631.2	52443	52355	$2.689 \pm 0.002$	$2.686 \pm 0.001$	5.5	2.3
544	161937.94+453338.4	52443	52355	$1.875 \pm 0.001$	$1.877 \pm 0.001$	4.4	2.0
545	102532.57+474919.7	52347	52674	$1.926 \pm 0.002$	$1.925 \pm 0.002$	8.7	8.5
546	102007.29+473124.1	52347	52674	$2.101 \pm 0.002$	$2.099 \pm 0.002$	8.9	8.8
547	102119.53+474703.7	52347	52674	$1.767 \pm 0.002$	$1.768 \pm 0.002$	11.5	10.8
548	101902.02+473714.5	52347	52674	$2.948 \pm 0.002$	$2.945 \pm 0.001$	9.7	7.7
549	101620.58+474227.3	52347	52674	$2.002 \pm 0.001$	$1.983 \pm 0.003$	9.9	11.1
550	101408.82+473150.6	52347	52674	$1.895 \pm 0.002$	$1.899 \pm 0.002$	9.4	11.1
551	101416.97+484816.1	52347	52674	$1.905 \pm 0.002$	$1.906 \pm 0.002$	12.1	12.3

Table 1—Continued

Number	SDSS J	MJD		HSN	$z$	$S/N_r$	
		HSN	LSN			HSN	LSN
552	101830.23+485110.2	52347	52674	$1.852 \pm 0.001$	$1.855 \pm 0.002$	12.3	10.3
553	102048.82+483908.8	52347	52674	$1.940 \pm 0.002$	$1.940 \pm 0.002$	17.5	16.9
554	102121.78+492059.0	52347	52674	$3.415 \pm 0.002$	$3.398 \pm 0.001$	5.5	4.6
555	102111.02+491330.3	52347	52674	$1.720 \pm 0.001$	$1.720 \pm 0.002$	10.8	9.3
556	105813.05+493936.1	52346	52669	$2.399 \pm 0.002$	$2.394 \pm 0.002$	5.6	7.2
557	105657.54+492957.9	52346	52669	$2.160 \pm 0.001$	$2.162 \pm 0.003$	12.2	16.5
558	105922.46+494918.2	52346	52669	$1.680 \pm 0.001$	$1.691 \pm 0.002$	2.7	5.9
559	105820.66+494604.1	52346	52669	$1.835 \pm 0.002$	$1.833 \pm 0.003$	3.3	8.2
560	105859.13+501000.7	52346	52669	$3.269 \pm 0.001$	$3.271 \pm 0.001$	10.1	11.9
561	105629.61+494340.6	52346	52669	$3.800 \pm 0.002$	$3.801 \pm 0.001$	5.0	6.1
562	105027.74+490453.0	52346	52669	$1.864 \pm 0.001$	$1.866 \pm 0.001$	6.2	11.1
563	104951.09+493156.2	52346	52669	$1.791 \pm 0.001$	$1.786 \pm 0.002$	7.4	9.7
564	104816.63+492714.1	52346	52669	$1.951 \pm 0.002$	$1.952 \pm 0.002$	10.6	10.4
565	104810.44+501150.0	52346	52669	$2.165 \pm 0.002$	$2.172 \pm 0.003$	13.2	9.7
566	104806.47+501021.5	52346	52669	$1.784 \pm 0.002$	$1.785 \pm 0.002$	3.8	3.6
567	104524.48+492822.0	52346	52669	$2.886 \pm 0.002$	$2.895 \pm 0.001$	7.4	6.1
568	104620.97+495337.8	52346	52669	$1.905 \pm 0.000$	$1.907 \pm 0.002$	12.9	10.6
569	104344.95+494516.7	52346	52669	$2.421 \pm 0.001$	$2.481 \pm 0.002$	16.8	10.8
570	104426.25+510506.2	52346	52669	$1.961 \pm 0.002$	$1.959 \pm 0.002$	11.6	9.5
571	105002.65+512729.5	52346	52669	$1.813 \pm 0.001$	$1.812 \pm 0.002$	15.9	11.1
572	105119.30+510544.8	52346	52669	$1.778 \pm 0.001$	$1.775 \pm 0.002$	15.5	10.6
573	104855.22+504845.5	52346	52669	$1.781 \pm 0.002$	$1.778 \pm 0.002$	12.1	9.9
574	105213.30+512826.1	52346	52669	$1.689 \pm 0.001$	$1.687 \pm 0.002$	8.5	7.0
575	105416.46+512724.5	52346	52669	$2.371 \pm 0.001$	$2.368 \pm 0.001$	16.1	12.7
576	105410.51+505905.1	52346	52669	$3.363 \pm 0.002$	$0.637 \pm 0.004$	9.4	9.1
577	105427.92+504835.6	52346	52669	$1.973 \pm 0.002$	$1.980 \pm 0.002$	8.5	6.3
578	105454.16+503123.9	52346	52669	$1.874 \pm 0.001$	$1.876 \pm 0.003$	19.1	12.4
579	105546.18+503959.7	52346	52669	$2.016 \pm 0.001$	$2.017 \pm 0.001$	17.8	14.7
580	105526.66+511328.7	52346	52669	$1.776 \pm 0.001$	$1.777 \pm 0.002$	7.0	5.2

Table 1—Continued

Number	SDSS J	MJD		HSN	$z$	$S/N_r$	
		HSN	LSN			HSN	LSN
581	105828.00+505700.9	52346	52669	$1.669 \pm 0.002$	$1.672 \pm 0.002$	13.5	9.1
582	105724.69+502030.3	52346	52669	$1.718 \pm 0.002$	$1.715 \pm 0.002$	7.8	8.3
583	105844.23+503315.7	52346	52669	$2.243 \pm 0.001$	$2.240 \pm 0.002$	13.2	9.6
584	074709.64+293756.2	52346	52663	$1.953 \pm 0.002$	$1.939 \pm 0.002$	9.4	8.7
585	074407.41+294707.4	52346	52663	$1.861 \pm 0.001$	$1.862 \pm 0.002$	10.9	14.0
586	074254.58+294714.9	52346	52663	$2.182 \pm 0.002$	$2.182 \pm 0.002$	12.8	12.1
587	074228.13+292123.8	52346	52663	$2.178 \pm 0.002$	$2.176 \pm 0.002$	12.9	12.6
588	074311.52+302549.1	52346	52663	$1.770 \pm 0.002$	$1.769 \pm 0.002$	10.8	8.2
589	074357.06+300742.7	52346	52663	$2.177 \pm 0.002$	$2.177 \pm 0.002$	15.6	14.6
590	074440.17+300241.8	52346	52663	$1.667 \pm 0.001$	$1.667 \pm 0.002$	12.8	11.8
591	074412.05+295906.7	52346	52663	$1.696 \pm 0.002$	$1.703 \pm 0.003$	22.9	19.0
592	074625.28+302020.7	52346	52663	$1.735 \pm 0.001$	$1.735 \pm 0.002$	27.8	21.7
593	074834.86+302550.4	52346	52663	$1.743 \pm 0.002$	$1.742 \pm 0.003$	10.1	11.2
594	074809.46+300630.5	52346	52663	$1.693 \pm 0.002$	$1.694 \pm 0.002$	18.6	19.2
595	074914.13+305605.8	52346	52663	$3.435 \pm 0.002$	$3.436 \pm 0.001$	13.1	11.8
596	074937.74+304021.4	52346	52663	$1.729 \pm 0.002$	$1.718 \pm 0.002$	3.7	4.8
597	221227.74+005140.6	52813	52525	$1.773 \pm 0.002$	$1.770 \pm 0.001$	13.5	10.9
598	082443.39+055503.7	52962	52737	$2.102 \pm 0.003$	$2.100 \pm 0.001$	13.3	9.0
599	082311.10+055643.6	52962	52737	$1.761 \pm 0.002$	$1.763 \pm 0.002$	9.8	5.9
600	082719.65+061835.3	52962	52737	$2.182 \pm 0.002$	$2.185 \pm 0.001$	6.3	3.9
601	082807.73+062133.9	52962	52737	$2.154 \pm 0.001$	$2.153 \pm 0.002$	21.4	12.4
602	082736.89+061812.1	52962	52737	$2.195 \pm 0.002$	$2.194 \pm 0.001$	28.6	18.6
603	082117.41+054536.4	52962	52737	$1.837 \pm 0.002$	$1.837 \pm 0.002$	13.3	7.5
604	082328.61+061146.0	52962	52737	$2.783 \pm 0.002$	$2.790 \pm 0.001$	24.8	14.6
605	082256.01+060528.7	52962	52737	$1.983 \pm 0.002$	$1.965 \pm 0.008$	9.4	4.2
606	081941.12+054942.6	52962	52737	$1.701 \pm 0.002$	$1.697 \pm 0.003$	2.8	2.3
607	081931.48+055523.6	52962	52737	$1.687 \pm 0.002$	$1.696 \pm 0.002$	21.1	12.6
608	081653.90+064307.1	52962	52737	$1.824 \pm 0.001$	$1.822 \pm 0.002$	8.3	5.4
609	082257.04+070104.3	52962	52737	$2.954 \pm 0.002$	$2.956 \pm 0.001$	17.5	10.2

Table 1—Continued

Number	SDSS J	MJD		HSN	$z$	LSN	$S/N_r$	
		HSN	LSN				HSN	LSN
610	082503.56+071344.0	52962	52737	$2.524 \pm 0.002$	$2.547 \pm 0.001$		10.0	6.8
611	082305.95+064930.5	52962	52737	$1.665 \pm 0.001$	$1.668 \pm 0.002$		15.5	10.9
612	082404.91+064322.2	52962	52737	$1.865 \pm 0.001$	$1.871 \pm 0.002$		8.5	5.9
613	082645.88+071647.0	52962	52737	$3.137 \pm 0.002$	$3.122 \pm 0.001$		18.3	12.5
614	082628.00+062556.5	52962	52737	$1.983 \pm 0.002$	$1.982 \pm 0.002$		10.7	7.5
615	082710.95+071650.5	52962	52737	$3.151 \pm 0.002$	$3.142 \pm 0.001$		4.2	2.6

Table 2. 1450Å Luminosity, C IV line dispersion, and estimated black hole mass at both epochs for all objects.

Number	$L_{1450}$ $10^{44} \text{ erg s}^{-1}$		$\sigma_{\text{C IV}}$ $\text{km s}^{-1}$		$\log(M_{\text{BH}}/M_{\odot})$	
	HSN	LSN	HSN	LSN	HSN	LSN
1	$48 \pm 8$	$57 \pm 11$	$3834 \pm 97$	$3740 \pm 159$	$8.79 \pm 0.05$	$8.81 \pm 0.06$
2	$197 \pm 17$	$212 \pm 22$	$4197 \pm 125$	$4408 \pm 122$	$9.19 \pm 0.03$	$9.25 \pm 0.03$
3	$105 \pm 10$	$193 \pm 18$	$3456 \pm 141$	$3440 \pm 261$	$8.88 \pm 0.04$	$9.01 \pm 0.07$
4	$396 \pm 23$	$315 \pm 22$	$3371 \pm 118$	$3320 \pm 119$	$9.16 \pm 0.03$	$9.10 \pm 0.04$
5	$208 \pm 21$	$164 \pm 20$	$3942 \pm 144$	$3970 \pm 159$	$9.15 \pm 0.04$	$9.10 \pm 0.05$
6	$379 \pm 45$	$268 \pm 49$	$2919 \pm 114$	$2708 \pm 174$	$9.03 \pm 0.04$	$8.88 \pm 0.07$
7	$86 \pm 11$	$73 \pm 10$	$3294 \pm 181$	$2229 \pm 475$	$8.79 \pm 0.06$	$8.41 \pm 0.19$
8	$58 \pm 8$	$48 \pm 6$	$3784 \pm 189$	$3904 \pm 155$	$8.82 \pm 0.06$	$8.81 \pm 0.05$
9	$224 \pm 20$	$235 \pm 24$	$3786 \pm 184$	$3732 \pm 218$	$9.13 \pm 0.05$	$9.13 \pm 0.06$
10	$127 \pm 12$	$117 \pm 13$	$3735 \pm 164$	$3627 \pm 174$	$8.99 \pm 0.04$	$8.95 \pm 0.05$
11	$291 \pm 20$	$321 \pm 27$	$3688 \pm 103$	$3703 \pm 161$	$9.17 \pm 0.03$	$9.20 \pm 0.04$
12	$92 \pm 8$	$122 \pm 14$	$3877 \pm 149$	$3903 \pm 292$	$8.95 \pm 0.04$	$9.02 \pm 0.07$
13	$92 \pm 10$	$106 \pm 15$	$3658 \pm 92$	$3626 \pm 112$	$8.90 \pm 0.03$	$8.92 \pm 0.04$
14	$311 \pm 21$	$312 \pm 24$	$4120 \pm 97$	$4009 \pm 131$	$9.28 \pm 0.03$	$9.26 \pm 0.03$
15	$206 \pm 14$	$207 \pm 9$	$3487 \pm 91$	$4118 \pm 61$	$9.04 \pm 0.03$	$9.19 \pm 0.02$
16	$109 \pm 16$	$128 \pm 24$	$3658 \pm 155$	$3564 \pm 209$	$8.94 \pm 0.05$	$8.95 \pm 0.07$
17	$64 \pm 6$	$79 \pm 13$	$4163 \pm 148$	$3770 \pm 427$	$8.93 \pm 0.04$	$8.89 \pm 0.11$
18	$166 \pm 11$	$197 \pm 23$	$4765 \pm 34$	$4636 \pm 62$	$9.26 \pm 0.02$	$9.28 \pm 0.03$
19	$37 \pm 7$	$53 \pm 10$	$4098 \pm 133$	$3921 \pm 189$	$8.79 \pm 0.05$	$8.83 \pm 0.06$
20	$91 \pm 9$	$123 \pm 17$	$3960 \pm 93$	$3294 \pm 245$	$8.96 \pm 0.03$	$8.87 \pm 0.07$
21	$310 \pm 23$	$373 \pm 50$	$3317 \pm 69$	$3116 \pm 138$	$9.09 \pm 0.03$	$9.08 \pm 0.05$
22	$247 \pm 12$	$340 \pm 26$	$3648 \pm 82$	$3622 \pm 145$	$9.12 \pm 0.02$	$9.19 \pm 0.04$
23	$29 \pm 6$	$20 \pm 13$	$4205 \pm 350$	$4115 \pm 556$	$8.76 \pm 0.09$	$8.65 \pm 0.20$
24	$62 \pm 7$	$58 \pm 12$	$3713 \pm 224$	$4024 \pm 319$	$8.82 \pm 0.06$	$8.88 \pm 0.08$
25	$131 \pm 7$	$122 \pm 14$	$3018 \pm 91$	$2769 \pm 215$	$8.81 \pm 0.03$	$8.72 \pm 0.07$
26	$175 \pm 15$	$189 \pm 26$	$3680 \pm 127$	$3542 \pm 241$	$9.05 \pm 0.04$	$9.04 \pm 0.07$
27	$121 \pm 12$	$167 \pm 18$	$3738 \pm 138$	$3364 \pm 263$	$8.98 \pm 0.04$	$8.96 \pm 0.07$
28	$110 \pm 17$	$109 \pm 20$	$3676 \pm 186$	$2753 \pm 603$	$8.94 \pm 0.06$	$8.69 \pm 0.20$
29	$129 \pm 13$	$78 \pm 16$	$4049 \pm 149$	$3497 \pm 406$	$9.07 \pm 0.04$	$8.82 \pm 0.11$



Table 2—Continued

Number	$L_{1450}$ $10^{44} \text{ erg s}^{-1}$		$\sigma_{\text{C IV}}$ $\text{km s}^{-1}$		$\log(M_{\text{BH}}/M_{\odot})$	
	HSN	LSN	HSN	LSN	HSN	LSN
30	$101 \pm 8$	$84 \pm 11$	$3404 \pm 156$	$3529 \pm 224$	$8.86 \pm 0.04$	$8.85 \pm 0.06$
31	$55 \pm 5$	$55 \pm 8$	$3596 \pm 63$	$3460 \pm 119$	$8.77 \pm 0.03$	$8.73 \pm 0.05$
32	$654 \pm 19$	$588 \pm 26$	$3345 \pm 48$	$3260 \pm 81$	$9.27 \pm 0.01$	$9.22 \pm 0.02$
33	$97 \pm 8$	$91 \pm 13$	$3022 \pm 156$	$3359 \pm 225$	$8.74 \pm 0.05$	$8.82 \pm 0.07$
34	$69 \pm 8$	$82 \pm 15$	$3457 \pm 106$	$3524 \pm 179$	$8.79 \pm 0.04$	$8.84 \pm 0.06$
35	$248 \pm 12$	$261 \pm 24$	$3733 \pm 57$	$4037 \pm 82$	$9.14 \pm 0.02$	$9.22 \pm 0.03$
36	$59 \pm 7$	$88 \pm 13$	$3528 \pm 133$	$3681 \pm 182$	$8.77 \pm 0.04$	$8.89 \pm 0.06$
37	$280 \pm 13$	$264 \pm 25$	$3749 \pm 50$	$3490 \pm 135$	$9.18 \pm 0.02$	$9.10 \pm 0.04$
38	$60 \pm 6$	$66 \pm 13$	$3223 \pm 165$	$2291 \pm 617$	$8.69 \pm 0.05$	$8.42 \pm 0.24$
39	$171 \pm 17$	$142 \pm 32$	$2612 \pm 230$	$2826 \pm 461$	$8.75 \pm 0.08$	$8.77 \pm 0.15$
40	$136 \pm 8$	$112 \pm 16$	$3648 \pm 110$	$3808 \pm 217$	$8.99 \pm 0.03$	$8.98 \pm 0.06$
41	$369 \pm 16$	$313 \pm 19$	$3912 \pm 44$	$3956 \pm 52$	$9.28 \pm 0.01$	$9.25 \pm 0.02$
42	$105 \pm 8$	$100 \pm 8$	$4288 \pm 49$	$4431 \pm 45$	$9.07 \pm 0.02$	$9.09 \pm 0.02$
43	$76 \pm 8$	$54 \pm 8$	$3339 \pm 156$	$3357 \pm 170$	$8.78 \pm 0.05$	$8.70 \pm 0.06$
44	$83 \pm 11$	$76 \pm 12$	$3370 \pm 358$	$4093 \pm 176$	$8.80 \pm 0.10$	$8.95 \pm 0.05$
45	$157 \pm 14$	$126 \pm 19$	$2429 \pm 248$	$3181 \pm 173$	$8.67 \pm 0.09$	$8.85 \pm 0.06$
46	$447 \pm 35$	$548 \pm 49$	$1851 \pm 139$	$1857 \pm 159$	$8.67 \pm 0.07$	$8.72 \pm 0.08$
47	$204 \pm 11$	$216 \pm 14$	$3660 \pm 74$	$3536 \pm 99$	$9.08 \pm 0.02$	$9.07 \pm 0.03$
48	$141 \pm 12$	$122 \pm 18$	$3923 \pm 92$	$3819 \pm 138$	$9.06 \pm 0.03$	$9.00 \pm 0.05$
49	$32 \pm 12$	$14 \pm 4$	$4156 \pm 157$	$4063 \pm 479$	$8.77 \pm 0.09$	$8.56 \pm 0.13$
50	$75 \pm 9$	$59 \pm 9$	$3703 \pm 144$	$3631 \pm 169$	$8.86 \pm 0.04$	$8.79 \pm 0.05$
51	$66 \pm 10$	$58 \pm 10$	$3341 \pm 333$	$3702 \pm 272$	$8.74 \pm 0.09$	$8.80 \pm 0.08$
52	$116 \pm 8$	$134 \pm 9$	$3679 \pm 127$	$3644 \pm 130$	$8.96 \pm 0.03$	$8.98 \pm 0.03$
53	$119 \pm 12$	$108 \pm 11$	$3479 \pm 140$	$3445 \pm 124$	$8.91 \pm 0.04$	$8.88 \pm 0.04$
54	$60 \pm 7$	$35 \pm 6$	$2997 \pm 321$	$3270 \pm 222$	$8.63 \pm 0.10$	$8.58 \pm 0.07$
55	$50 \pm 7$	$51 \pm 6$	$3872 \pm 211$	$3956 \pm 183$	$8.81 \pm 0.06$	$8.83 \pm 0.05$
56	$82 \pm 11$	$67 \pm 10$	$2065 \pm 277$	$2214 \pm 230$	$8.37 \pm 0.12$	$8.39 \pm 0.10$
57	$28 \pm 9$	$30 \pm 8$	$3439 \pm 588$	$3820 \pm 356$	$8.57 \pm 0.17$	$8.68 \pm 0.10$
58	$177 \pm 47$	$158 \pm 28$	$3286 \pm 479$	$3638 \pm 352$	$8.96 \pm 0.14$	$9.02 \pm 0.09$

Table 2—Continued

Number	$L_{1450}$ $10^{44} \text{ erg s}^{-1}$		$\sigma_{\text{C IV}}$ $\text{km s}^{-1}$		$\log(M_{\text{BH}}/M_{\odot})$	
	HSN	LSN	HSN	LSN	HSN	LSN
59	$24 \pm 14$	$18 \pm 10$	$2911 \pm 348$	$2225 \pm 579$	$8.39 \pm 0.17$	$8.10 \pm 0.26$
60	$238 \pm 13$	$241 \pm 12$	$3721 \pm 118$	$3687 \pm 109$	$9.13 \pm 0.03$	$9.13 \pm 0.03$
61	$96 \pm 9$	$102 \pm 8$	$3338 \pm 132$	$3607 \pm 105$	$8.83 \pm 0.04$	$8.91 \pm 0.03$
62	$24 \pm 11$	$29 \pm 9$	$3512 \pm 353$	$3468 \pm 390$	$8.55 \pm 0.14$	$8.59 \pm 0.12$
63	$167 \pm 11$	$161 \pm 10$	$3307 \pm 142$	$3219 \pm 127$	$8.95 \pm 0.04$	$8.92 \pm 0.04$
64	$145 \pm 10$	$125 \pm 8$	$3581 \pm 145$	$3096 \pm 168$	$8.98 \pm 0.04$	$8.82 \pm 0.05$
65	$35 \pm 7$	$40 \pm 7$	$1550 \pm 454$	$1899 \pm 383$	$7.93 \pm 0.26$	$8.14 \pm 0.18$
66	$69 \pm 12$	$60 \pm 11$	$3608 \pm 143$	$3557 \pm 119$	$8.82 \pm 0.05$	$8.78 \pm 0.05$
67	$88 \pm 14$	$102 \pm 11$	$4255 \pm 101$	$3962 \pm 148$	$9.02 \pm 0.04$	$8.99 \pm 0.04$
68	$159 \pm 97$	$159 \pm 118$	$3501 \pm 152$	$3684 \pm 124$	$8.99 \pm 0.15$	$9.03 \pm 0.17$
69	$337 \pm 36$	$357 \pm 39$	$3397 \pm 119$	$3454 \pm 123$	$9.13 \pm 0.04$	$9.16 \pm 0.04$
70	$140 \pm 17$	$145 \pm 16$	$3382 \pm 140$	$3277 \pm 138$	$8.93 \pm 0.05$	$8.91 \pm 0.05$
71	$85 \pm 10$	$86 \pm 11$	$4136 \pm 105$	$4229 \pm 119$	$8.99 \pm 0.04$	$9.01 \pm 0.04$
72	$344 \pm 29$	$292 \pm 28$	$3173 \pm 77$	$3093 \pm 90$	$9.08 \pm 0.03$	$9.02 \pm 0.03$
73	$56 \pm 7$	$73 \pm 9$	$4145 \pm 104$	$3665 \pm 159$	$8.89 \pm 0.04$	$8.85 \pm 0.05$
74	$63 \pm 8$	$71 \pm 11$	$3536 \pm 155$	$3262 \pm 276$	$8.78 \pm 0.05$	$8.74 \pm 0.08$
75	$91 \pm 8$	$101 \pm 9$	$3175 \pm 98$	$3248 \pm 96$	$8.77 \pm 0.03$	$8.82 \pm 0.03$
76	$85 \pm 12$	$77 \pm 14$	$3507 \pm 143$	$3868 \pm 134$	$8.84 \pm 0.05$	$8.91 \pm 0.05$
77	$246 \pm 13$	$221 \pm 14$	$3682 \pm 98$	$3865 \pm 89$	$9.13 \pm 0.03$	$9.15 \pm 0.03$
78	$131 \pm 16$	$124 \pm 25$	$3697 \pm 116$	$3375 \pm 253$	$8.99 \pm 0.04$	$8.90 \pm 0.08$
79	$80 \pm 9$	$71 \pm 13$	$3645 \pm 143$	$2977 \pm 480$	$8.86 \pm 0.04$	$8.66 \pm 0.15$
80	$60 \pm 10$	$42 \pm 10$	$3374 \pm 103$	$3282 \pm 132$	$8.73 \pm 0.05$	$8.62 \pm 0.07$
81	$232 \pm 15$	$252 \pm 23$	$4046 \pm 87$	$3638 \pm 173$	$9.20 \pm 0.02$	$9.13 \pm 0.05$
82	$63 \pm 9$	$64 \pm 13$	$3923 \pm 68$	$4087 \pm 82$	$8.87 \pm 0.04$	$8.91 \pm 0.05$
83	$185 \pm 12$	$198 \pm 16$	$3331 \pm 81$	$3321 \pm 105$	$8.98 \pm 0.03$	$8.99 \pm 0.03$
84	$79 \pm 13$	$83 \pm 19$	$3452 \pm 658$	$3570 \pm 637$	$8.81 \pm 0.17$	$8.85 \pm 0.16$
85	$209 \pm 17$	$169 \pm 20$	$4183 \pm 79$	$3977 \pm 125$	$9.20 \pm 0.03$	$9.11 \pm 0.04$
86	$570 \pm 30$	$561 \pm 32$	$3977 \pm 69$	$4115 \pm 81$	$9.39 \pm 0.02$	$9.42 \pm 0.02$
87	$302 \pm 24$	$303 \pm 30$	$3433 \pm 81$	$3554 \pm 97$	$9.12 \pm 0.03$	$9.15 \pm 0.03$

Table 2—Continued

Number	$L_{1450}$ $10^{44} \text{ erg s}^{-1}$		$\sigma_{\text{C IV}}$ $\text{km s}^{-1}$		$\log(M_{BH}/M_{\odot})$	
	HSN	LSN	HSN	LSN	HSN	LSN
88	$136 \pm 13$	$123 \pm 15$	$3170 \pm 360$	$3926 \pm 178$	$8.86 \pm 0.10$	$9.03 \pm 0.05$
89	$111 \pm 10$	$95 \pm 11$	$3401 \pm 269$	$3676 \pm 230$	$8.88 \pm 0.07$	$8.91 \pm 0.06$
90	$261 \pm 21$	$209 \pm 27$	$3185 \pm 159$	$3268 \pm 179$	$9.02 \pm 0.05$	$8.99 \pm 0.06$
91	$93 \pm 20$	$77 \pm 31$	$2633 \pm 363$	$3808 \pm 196$	$8.62 \pm 0.13$	$8.89 \pm 0.10$
92	$31 \pm 7$	$44 \pm 8$	$2853 \pm 749$	$2993 \pm 673$	$8.43 \pm 0.24$	$8.55 \pm 0.20$
93	$60 \pm 71$	$98 \pm 70$	$3645 \pm 356$	$3787 \pm 272$	$8.80 \pm 0.28$	$8.94 \pm 0.18$
94	$207 \pm 13$	$214 \pm 14$	$3099 \pm 308$	$3857 \pm 145$	$8.94 \pm 0.09$	$9.14 \pm 0.04$
95	$60 \pm 8$	$65 \pm 10$	$2261 \pm 545$	$2430 \pm 518$	$8.38 \pm 0.21$	$8.46 \pm 0.19$
96	$57 \pm 7$	$41 \pm 8$	$3254 \pm 271$	$3431 \pm 327$	$8.69 \pm 0.08$	$8.66 \pm 0.10$
97	$585 \pm 28$	$602 \pm 32$	$3594 \pm 51$	$3495 \pm 68$	$9.31 \pm 0.02$	$9.29 \pm 0.02$
98	$241 \pm 27$	$310 \pm 36$	$3848 \pm 162$	$4574 \pm 147$	$9.16 \pm 0.04$	$9.37 \pm 0.04$
99	$150 \pm 12$	$149 \pm 14$	$3800 \pm 111$	$3913 \pm 123$	$9.04 \pm 0.03$	$9.07 \pm 0.04$
100	$211 \pm 9$	$223 \pm 11$	$2873 \pm 100$	$2807 \pm 115$	$8.88 \pm 0.03$	$8.87 \pm 0.04$
101	$131 \pm 11$	$183 \pm 14$	$3920 \pm 150$	$3711 \pm 192$	$9.04 \pm 0.04$	$9.07 \pm 0.05$
102	$123 \pm 10$	$125 \pm 14$	$3000 \pm 123$	$3045 \pm 134$	$8.79 \pm 0.04$	$8.81 \pm 0.05$
103	$86 \pm 8$	$54 \pm 12$	$3353 \pm 334$	$3479 \pm 433$	$8.81 \pm 0.09$	$8.73 \pm 0.12$
104	$53 \pm 6$	$45 \pm 8$	$3244 \pm 234$	$3340 \pm 310$	$8.67 \pm 0.07$	$8.65 \pm 0.09$
105	$27 \pm 5$	$18 \pm 8$	$3532 \pm 360$	$2716 \pm 692$	$8.59 \pm 0.10$	$8.27 \pm 0.25$
106	$86 \pm 9$	$87 \pm 11$	$3638 \pm 70$	$3630 \pm 90$	$8.88 \pm 0.03$	$8.88 \pm 0.04$
107	$613 \pm 31$	$637 \pm 35$	$3597 \pm 122$	$4781 \pm 152$	$9.32 \pm 0.03$	$9.58 \pm 0.03$
108	$122 \pm 9$	$102 \pm 10$	$3661 \pm 128$	$3583 \pm 171$	$8.96 \pm 0.04$	$8.90 \pm 0.05$
109	$204 \pm 12$	$188 \pm 13$	$4275 \pm 97$	$3915 \pm 151$	$9.22 \pm 0.02$	$9.12 \pm 0.04$
110	$206 \pm 70$	$82 \pm 84$	$4411 \pm 121$	$4008 \pm 249$	$9.25 \pm 0.08$	$8.95 \pm 0.24$
111	$79 \pm 9$	$69 \pm 10$	$3823 \pm 203$	$4059 \pm 247$	$8.90 \pm 0.05$	$8.92 \pm 0.06$
112	$254 \pm 19$	$223 \pm 27$	$3420 \pm 125$	$3781 \pm 135$	$9.07 \pm 0.04$	$9.13 \pm 0.04$
113	$327 \pm 36$	$416 \pm 44$	$3172 \pm 206$	$3187 \pm 240$	$9.07 \pm 0.06$	$9.13 \pm 0.07$
114	$63 \pm 11$	$64 \pm 14$	$2953 \pm 355$	$3534 \pm 277$	$8.62 \pm 0.11$	$8.79 \pm 0.08$
115	$56 \pm 15$	$54 \pm 19$	$3285 \pm 201$	$3312 \pm 249$	$8.69 \pm 0.08$	$8.69 \pm 0.10$
116	$180 \pm 13$	$179 \pm 14$	$3246 \pm 266$	$3005 \pm 293$	$8.95 \pm 0.07$	$8.88 \pm 0.09$

Table 2—Continued

Number	$L_{1450}$ $10^{44} \text{ erg s}^{-1}$		$\sigma_{\text{C IV}}$ $\text{km s}^{-1}$		$\log(M_{\text{BH}}/M_{\odot})$	
	HSN	LSN	HSN	LSN	HSN	LSN
117	$75 \pm 7$	$68 \pm 9$	$3785 \pm 129$	$3390 \pm 226$	$8.88 \pm 0.04$	$8.76 \pm 0.07$
118	$110 \pm 13$	$134 \pm 17$	$3669 \pm 146$	$3335 \pm 220$	$8.94 \pm 0.05$	$8.90 \pm 0.06$
119	$105 \pm 16$	$137 \pm 18$	$4010 \pm 274$	$3435 \pm 514$	$9.01 \pm 0.07$	$8.93 \pm 0.13$
120	$108 \pm 9$	$92 \pm 10$	$3162 \pm 157$	$3160 \pm 175$	$8.81 \pm 0.05$	$8.77 \pm 0.06$
121	$111 \pm 16$	$127 \pm 20$	$3316 \pm 131$	$2889 \pm 194$	$8.86 \pm 0.05$	$8.77 \pm 0.07$
122	$225 \pm 16$	$231 \pm 19$	$3643 \pm 105$	$3771 \pm 116$	$9.10 \pm 0.03$	$9.14 \pm 0.03$
123	$354 \pm 17$	$382 \pm 19$	$3016 \pm 63$	$3068 \pm 66$	$9.04 \pm 0.02$	$9.07 \pm 0.02$
124	$143 \pm 15$	$144 \pm 12$	$3731 \pm 129$	$3695 \pm 117$	$9.02 \pm 0.04$	$9.01 \pm 0.03$
125	$160 \pm 14$	$152 \pm 16$	$3605 \pm 139$	$3558 \pm 177$	$9.01 \pm 0.04$	$8.99 \pm 0.05$
126	$78 \pm 9$	$72 \pm 10$	$3552 \pm 93$	$3300 \pm 140$	$8.84 \pm 0.04$	$8.75 \pm 0.05$
127	$62 \pm 8$	$73 \pm 9$	$2674 \pm 269$	$2547 \pm 345$	$8.53 \pm 0.09$	$8.53 \pm 0.12$
128	$243 \pm 24$	$227 \pm 24$	$2847 \pm 104$	$3000 \pm 94$	$8.90 \pm 0.04$	$8.93 \pm 0.04$
129	$140 \pm 16$	$144 \pm 16$	$2931 \pm 153$	$2912 \pm 142$	$8.80 \pm 0.05$	$8.80 \pm 0.05$
130	$157 \pm 8$	$57 \pm 3$	$3609 \pm 374$	$4788 \pm 275$	$9.01 \pm 0.09$	$9.02 \pm 0.05$
131	$262 \pm 30$	$281 \pm 31$	$2903 \pm 189$	$2476 \pm 378$	$8.94 \pm 0.06$	$8.82 \pm 0.14$
132	$85 \pm 12$	$80 \pm 13$	$3514 \pm 395$	$3038 \pm 527$	$8.85 \pm 0.10$	$8.71 \pm 0.16$
133	$534 \pm 23$	$505 \pm 26$	$3519 \pm 92$	$3601 \pm 106$	$9.27 \pm 0.02$	$9.28 \pm 0.03$
134	$29 \pm 6$	$26 \pm 7$	$2790 \pm 505$	$2713 \pm 544$	$8.40 \pm 0.17$	$8.35 \pm 0.19$
135	$68 \pm 9$	$47 \pm 10$	$2856 \pm 437$	$3554 \pm 220$	$8.62 \pm 0.14$	$8.72 \pm 0.07$
136	$232 \pm 9$	$193 \pm 11$	$3548 \pm 62$	$3528 \pm 79$	$9.08 \pm 0.02$	$9.04 \pm 0.02$
137	$181 \pm 14$	$190 \pm 15$	$4020 \pm 60$	$3780 \pm 84$	$9.14 \pm 0.02$	$9.09 \pm 0.03$
138	$31 \pm 17$	$81 \pm 23$	$4018 \pm 288$	$4031 \pm 263$	$8.73 \pm 0.14$	$8.95 \pm 0.09$
139	$101 \pm 10$	$129 \pm 14$	$3437 \pm 90$	$3522 \pm 101$	$8.87 \pm 0.03$	$8.94 \pm 0.04$
140	$179 \pm 13$	$166 \pm 16$	$2759 \pm 170$	$2989 \pm 184$	$8.81 \pm 0.06$	$8.86 \pm 0.06$
141	$72 \pm 7$	$62 \pm 11$	$3518 \pm 108$	$3109 \pm 257$	$8.81 \pm 0.04$	$8.67 \pm 0.08$
142	$251 \pm 23$	$199 \pm 25$	$3070 \pm 123$	$2022 \pm 368$	$8.98 \pm 0.04$	$8.56 \pm 0.16$
143	$95 \pm 8$	$92 \pm 9$	$3284 \pm 138$	$3130 \pm 188$	$8.81 \pm 0.04$	$8.76 \pm 0.06$
144	$44 \pm 7$	$35 \pm 7$	$3125 \pm 342$	$3505 \pm 251$	$8.59 \pm 0.10$	$8.64 \pm 0.08$
145	$88 \pm 10$	$80 \pm 10$	$3541 \pm 182$	$3689 \pm 193$	$8.86 \pm 0.05$	$8.87 \pm 0.05$

Table 2—Continued

Number	$L_{1450}$ $10^{44} \text{ erg s}^{-1}$		$\sigma_{\text{C IV}}$ $\text{km s}^{-1}$		$\log(M_{\text{BH}}/M_{\odot})$	
	HSN	LSN	HSN	LSN	HSN	LSN
146	$220 \pm 27$	$254 \pm 28$	$1105 \pm 486$	$2206 \pm 447$	$8.06 \pm 0.38$	$8.69 \pm 0.18$
147	$65 \pm 9$	$50 \pm 11$	$3473 \pm 604$	$3998 \pm 396$	$8.77 \pm 0.15$	$8.83 \pm 0.10$
148	$39 \pm 6$	$51 \pm 8$	$3581 \pm 104$	$3479 \pm 148$	$8.69 \pm 0.05$	$8.72 \pm 0.05$
149	$55 \pm 13$	$45 \pm 19$	$3816 \pm 127$	$3651 \pm 235$	$8.82 \pm 0.06$	$8.74 \pm 0.11$
150	$220 \pm 16$	$248 \pm 22$	$3877 \pm 67$	$3790 \pm 85$	$9.15 \pm 0.02$	$9.16 \pm 0.03$
151	$148 \pm 12$	$178 \pm 17$	$3368 \pm 110$	$3322 \pm 148$	$8.94 \pm 0.03$	$8.97 \pm 0.05$
152	$97 \pm 9$	$125 \pm 14$	$3741 \pm 92$	$3655 \pm 129$	$8.93 \pm 0.03$	$8.97 \pm 0.04$
153	$349 \pm 39$	$393 \pm 58$	$4023 \pm 110$	$3778 \pm 185$	$9.29 \pm 0.04$	$9.26 \pm 0.05$
154	$84 \pm 9$	$103 \pm 14$	$3589 \pm 69$	$3418 \pm 117$	$8.86 \pm 0.03$	$8.87 \pm 0.04$
155	$57 \pm 7$	$54 \pm 14$	$3937 \pm 333$	$2065 \pm 2013$	$8.85 \pm 0.08$	$8.28 \pm 0.85$
156	$233 \pm 13$	$249 \pm 17$	$3307 \pm 78$	$3383 \pm 100$	$9.02 \pm 0.02$	$9.06 \pm 0.03$
157	$282 \pm 18$	$247 \pm 21$	$3786 \pm 102$	$3764 \pm 116$	$9.19 \pm 0.03$	$9.15 \pm 0.03$
158	$102 \pm 8$	$107 \pm 12$	$3960 \pm 122$	$3992 \pm 133$	$8.99 \pm 0.03$	$9.01 \pm 0.04$
159	$335 \pm 57$	$344 \pm 73$	$3474 \pm 131$	$3622 \pm 182$	$9.15 \pm 0.05$	$9.19 \pm 0.07$
160	$168 \pm 9$	$135 \pm 10$	$3942 \pm 80$	$4069 \pm 87$	$9.10 \pm 0.02$	$9.08 \pm 0.03$
161	$279 \pm 33$	$270 \pm 42$	$3917 \pm 111$	$3672 \pm 179$	$9.21 \pm 0.04$	$9.15 \pm 0.06$
162	$138 \pm 12$	$145 \pm 16$	$4288 \pm 70$	$4199 \pm 97$	$9.13 \pm 0.03$	$9.12 \pm 0.03$
163	$191 \pm 86$	$22 \pm 6$	$3914 \pm 90$	$6656 \pm 208$	$9.12 \pm 0.11$	$9.09 \pm 0.07$
164	$172 \pm 14$	$179 \pm 14$	$3716 \pm 124$	$3758 \pm 106$	$9.06 \pm 0.04$	$9.07 \pm 0.03$
165	$171 \pm 15$	$203 \pm 17$	$2828 \pm 133$	$3077 \pm 116$	$8.82 \pm 0.05$	$8.93 \pm 0.04$
166	$60 \pm 8$	$66 \pm 7$	$3460 \pm 302$	$4081 \pm 182$	$8.75 \pm 0.08$	$8.92 \pm 0.05$
167	$329 \pm 52$	$277 \pm 42$	$2428 \pm 210$	$2404 \pm 188$	$8.83 \pm 0.08$	$8.79 \pm 0.08$
168	$140 \pm 23$	$118 \pm 17$	$3810 \pm 143$	$3701 \pm 126$	$9.03 \pm 0.05$	$8.96 \pm 0.05$
169	$48 \pm 8$	$39 \pm 7$	$3708 \pm 173$	$3652 \pm 157$	$8.76 \pm 0.06$	$8.70 \pm 0.06$
170	$68 \pm 9$	$62 \pm 9$	$3617 \pm 182$	$2933 \pm 251$	$8.82 \pm 0.06$	$8.62 \pm 0.08$
171	$132 \pm 14$	$123 \pm 14$	$4057 \pm 152$	$4240 \pm 119$	$9.07 \pm 0.04$	$9.09 \pm 0.04$
172	$70 \pm 11$	$70 \pm 10$	$1761 \pm 578$	$2975 \pm 289$	$8.20 \pm 0.29$	$8.66 \pm 0.09$
173	$116 \pm 14$	$105 \pm 16$	$3534 \pm 361$	$4371 \pm 163$	$8.92 \pm 0.09$	$9.08 \pm 0.05$
174	$135 \pm 10$	$120 \pm 11$	$3512 \pm 103$	$3398 \pm 127$	$8.95 \pm 0.03$	$8.90 \pm 0.04$

Table 2—Continued

Number	$L_{1450}$ $10^{44} \text{ erg s}^{-1}$		$\sigma_{\text{C IV}}$ $\text{km s}^{-1}$		$\log(M_{\text{BH}}/M_{\odot})$	
	HSN	LSN	HSN	LSN	HSN	LSN
175	$475 \pm 27$	$449 \pm 29$	$3337 \pm 173$	$2813 \pm 297$	$9.20 \pm 0.05$	$9.03 \pm 0.09$
176	$374 \pm 27$	$353 \pm 36$	$3333 \pm 127$	$3131 \pm 188$	$9.14 \pm 0.04$	$9.07 \pm 0.06$
177	$394 \pm 16$	$427 \pm 19$	$3774 \pm 71$	$3666 \pm 96$	$9.26 \pm 0.02$	$9.25 \pm 0.03$
178	$54 \pm 8$	$61 \pm 9$	$4722 \pm 141$	$4981 \pm 108$	$9.00 \pm 0.04$	$9.07 \pm 0.04$
179	$70 \pm 11$	$57 \pm 9$	$3068 \pm 191$	$3015 \pm 163$	$8.68 \pm 0.07$	$8.62 \pm 0.06$
180	$51 \pm 9$	$69 \pm 9$	$3591 \pm 320$	$3805 \pm 201$	$8.75 \pm 0.09$	$8.87 \pm 0.06$
181	$162 \pm 18$	$177 \pm 16$	$3663 \pm 107$	$3617 \pm 88$	$9.03 \pm 0.04$	$9.04 \pm 0.03$
182	$109 \pm 15$	$125 \pm 14$	$3531 \pm 78$	$3633 \pm 62$	$8.91 \pm 0.04$	$8.96 \pm 0.03$
183	$64 \pm 8$	$65 \pm 8$	$4340 \pm 99$	$4301 \pm 106$	$8.97 \pm 0.04$	$8.96 \pm 0.04$
184	$71 \pm 11$	$79 \pm 12$	$3914 \pm 151$	$3759 \pm 179$	$8.90 \pm 0.05$	$8.89 \pm 0.05$
185	$238 \pm 22$	$276 \pm 26$	$3374 \pm 66$	$3311 \pm 79$	$9.05 \pm 0.03$	$9.06 \pm 0.03$
186	$269 \pm 20$	$275 \pm 25$	$2943 \pm 273$	$2955 \pm 298$	$8.96 \pm 0.08$	$8.96 \pm 0.09$
187	$171 \pm 17$	$176 \pm 24$	$2247 \pm 243$	$2581 \pm 264$	$8.62 \pm 0.10$	$8.75 \pm 0.09$
188	$107 \pm 7$	$115 \pm 14$	$3576 \pm 166$	$2955 \pm 514$	$8.91 \pm 0.04$	$8.76 \pm 0.15$
189	$135 \pm 45$	$155 \pm 82$	$3018 \pm 221$	$2969 \pm 241$	$8.82 \pm 0.10$	$8.84 \pm 0.14$
190	$254 \pm 14$	$279 \pm 24$	$3408 \pm 127$	$3379 \pm 168$	$9.07 \pm 0.04$	$9.08 \pm 0.05$
191	$64 \pm 11$	$76 \pm 15$	$3568 \pm 219$	$2489 \pm 635$	$8.79 \pm 0.07$	$8.52 \pm 0.23$
192	$336 \pm 30$	$282 \pm 36$	$2777 \pm 202$	$1646 \pm 540$	$8.96 \pm 0.07$	$8.46 \pm 0.29$
193	$74 \pm 10$	$73 \pm 8$	$3528 \pm 290$	$3906 \pm 201$	$8.82 \pm 0.08$	$8.90 \pm 0.05$
194	$156 \pm 15$	$147 \pm 15$	$2544 \pm 323$	$2252 \pm 442$	$8.70 \pm 0.11$	$8.59 \pm 0.17$
195	$201 \pm 25$	$175 \pm 33$	$3484 \pm 245$	$3547 \pm 309$	$9.04 \pm 0.07$	$9.02 \pm 0.09$
196	$136 \pm 13$	$119 \pm 22$	$4112 \pm 181$	$4014 \pm 303$	$9.09 \pm 0.04$	$9.04 \pm 0.08$
197	$189 \pm 11$	$185 \pm 18$	$3317 \pm 181$	$3602 \pm 241$	$8.98 \pm 0.05$	$9.05 \pm 0.06$
198	$280 \pm 19$	$253 \pm 33$	$3445 \pm 128$	$3723 \pm 165$	$9.10 \pm 0.04$	$9.15 \pm 0.05$
199	$109 \pm 7$	$103 \pm 13$	$2840 \pm 193$	$2699 \pm 444$	$8.72 \pm 0.06$	$8.66 \pm 0.15$
200	$36 \pm 80$	$86 \pm 154$	$4547 \pm 211$	$3850 \pm 746$	$8.88 \pm 0.51$	$8.93 \pm 0.44$
201	$75 \pm 6$	$85 \pm 12$	$3361 \pm 152$	$3588 \pm 242$	$8.78 \pm 0.04$	$8.86 \pm 0.07$
202	$82 \pm 9$	$92 \pm 14$	$3205 \pm 131$	$3078 \pm 214$	$8.76 \pm 0.04$	$8.75 \pm 0.07$
203	$319 \pm 14$	$273 \pm 11$	$3887 \pm 52$	$3862 \pm 53$	$9.24 \pm 0.02$	$9.20 \pm 0.02$

Table 2—Continued

Number	$L_{1450}$ $10^{44} \text{ erg s}^{-1}$		$\sigma_{\text{C IV}}$ $\text{km s}^{-1}$		$\log(M_{\text{BH}}/M_{\odot})$	
	HSN	LSN	HSN	LSN	HSN	LSN
204	$105 \pm 7$	$100 \pm 9$	$3535 \pm 110$	$3921 \pm 102$	$8.90 \pm 0.03$	$8.98 \pm 0.03$
205	$52 \pm 8$	$49 \pm 8$	$3148 \pm 282$	$3787 \pm 193$	$8.64 \pm 0.09$	$8.79 \pm 0.06$
206	$415 \pm 21$	$442 \pm 24$	$3551 \pm 83$	$2486 \pm 271$	$9.22 \pm 0.02$	$8.92 \pm 0.10$
207	$165 \pm 16$	$153 \pm 18$	$3054 \pm 181$	$2905 \pm 232$	$8.88 \pm 0.06$	$8.81 \pm 0.07$
208	$346 \pm 17$	$336 \pm 19$	$3770 \pm 86$	$3510 \pm 121$	$9.23 \pm 0.02$	$9.16 \pm 0.03$
209	$134 \pm 10$	$139 \pm 13$	$3281 \pm 135$	$3404 \pm 160$	$8.89 \pm 0.04$	$8.93 \pm 0.05$
210	$184 \pm 8$	$182 \pm 11$	$3462 \pm 87$	$3096 \pm 160$	$9.01 \pm 0.02$	$8.91 \pm 0.05$
211	$50 \pm 7$	$64 \pm 9$	$4131 \pm 127$	$4406 \pm 137$	$8.86 \pm 0.04$	$8.98 \pm 0.04$
212	$274 \pm 10$	$268 \pm 12$	$2805 \pm 171$	$3207 \pm 147$	$8.92 \pm 0.05$	$9.03 \pm 0.04$
213	$956 \pm 28$	$1008 \pm 29$	$3540 \pm 49$	$3279 \pm 64$	$9.41 \pm 0.01$	$9.35 \pm 0.02$
214	$188 \pm 18$	$190 \pm 19$	$3402 \pm 195$	$3123 \pm 236$	$9.00 \pm 0.05$	$8.93 \pm 0.07$
215	$186 \pm 16$	$99 \pm 3$	$3624 \pm 192$	$3443 \pm 259$	$9.05 \pm 0.05$	$8.86 \pm 0.07$
216	$73 \pm 6$	$80 \pm 8$	$3554 \pm 162$	$3395 \pm 224$	$8.82 \pm 0.05$	$8.80 \pm 0.06$
217	$221 \pm 16$	$227 \pm 31$	$2636 \pm 208$	$2688 \pm 340$	$8.82 \pm 0.07$	$8.84 \pm 0.11$
218	$627 \pm 19$	$644 \pm 22$	$3372 \pm 50$	$3496 \pm 50$	$9.27 \pm 0.01$	$9.31 \pm 0.01$
219	$12 \pm 6$	$14 \pm 8$	$3488 \pm 262$	$3630 \pm 300$	$8.40 \pm 0.13$	$8.47 \pm 0.14$
220	$52 \pm 7$	$56 \pm 8$	$3476 \pm 325$	$3389 \pm 393$	$8.72 \pm 0.09$	$8.72 \pm 0.11$
221	$41 \pm 6$	$36 \pm 9$	$3796 \pm 128$	$3651 \pm 242$	$8.74 \pm 0.05$	$8.68 \pm 0.08$
222	$296 \pm 28$	$273 \pm 40$	$3760 \pm 115$	$3794 \pm 153$	$9.19 \pm 0.03$	$9.18 \pm 0.05$
223	$59 \pm 6$	$97 \pm 8$	$3574 \pm 414$	$3784 \pm 504$	$8.78 \pm 0.10$	$8.94 \pm 0.12$
224	$88 \pm 10$	$80 \pm 13$	$3427 \pm 182$	$3061 \pm 352$	$8.83 \pm 0.05$	$8.71 \pm 0.11$
225	$18 \pm 6$	$9 \pm 9$	$3742 \pm 362$	$4286 \pm 296$	$8.55 \pm 0.12$	$8.52 \pm 0.24$
226	$30 \pm 6$	$21 \pm 10$	$3522 \pm 223$	$2899 \pm 628$	$8.61 \pm 0.07$	$8.37 \pm 0.22$
227	$22 \pm 7$	$16 \pm 10$	$3317 \pm 507$	$3412 \pm 750$	$8.49 \pm 0.15$	$8.45 \pm 0.24$
228	$124 \pm 28$	$88 \pm 11$	$3446 \pm 267$	$3617 \pm 127$	$8.92 \pm 0.09$	$8.88 \pm 0.04$
229	$59 \pm 8$	$58 \pm 9$	$4496 \pm 74$	$4085 \pm 125$	$8.97 \pm 0.03$	$8.89 \pm 0.05$
230	$122 \pm 13$	$118 \pm 15$	$3511 \pm 204$	$3654 \pm 203$	$8.93 \pm 0.06$	$8.95 \pm 0.06$
231	$27 \pm 6$	$20 \pm 8$	$3104 \pm 313$	$3010 \pm 515$	$8.48 \pm 0.10$	$8.39 \pm 0.17$
232	$112 \pm 15$	$88 \pm 17$	$3576 \pm 175$	$2911 \pm 384$	$8.92 \pm 0.05$	$8.69 \pm 0.12$

Table 2—Continued

Number	$L_{1450}$ $10^{44} \text{ erg s}^{-1}$		$\sigma_{\text{C IV}}$ $\text{km s}^{-1}$		$\log(M_{\text{BH}}/M_{\odot})$	
	HSN	LSN	HSN	LSN	HSN	LSN
233	$47 \pm 8$	$23 \pm 8$	$3156 \pm 420$	$3607 \pm 387$	$8.62 \pm 0.12$	$8.57 \pm 0.13$
234	$92 \pm 11$	$92 \pm 12$	$3674 \pm 202$	$3619 \pm 240$	$8.90 \pm 0.06$	$8.89 \pm 0.07$
235	$93 \pm 8$	$75 \pm 9$	$3085 \pm 132$	$2853 \pm 184$	$8.75 \pm 0.04$	$8.64 \pm 0.06$
236	$71 \pm 12$	$64 \pm 16$	$3541 \pm 166$	$3566 \pm 222$	$8.81 \pm 0.06$	$8.79 \pm 0.08$
237	$32 \pm 8$	$40 \pm 10$	$3975 \pm 298$	$3495 \pm 471$	$8.73 \pm 0.09$	$8.67 \pm 0.13$
238	$23 \pm 8$	$22 \pm 6$	$3385 \pm 695$	$3202 \pm 659$	$8.52 \pm 0.20$	$8.45 \pm 0.19$
239	$101 \pm 10$	$102 \pm 9$	$3379 \pm 114$	$3464 \pm 95$	$8.85 \pm 0.04$	$8.87 \pm 0.03$
240	$64 \pm 11$	$61 \pm 10$	$3786 \pm 113$	$3530 \pm 121$	$8.84 \pm 0.05$	$8.77 \pm 0.05$
241	$69 \pm 14$	$54 \pm 12$	$3097 \pm 305$	$3057 \pm 275$	$8.69 \pm 0.10$	$8.62 \pm 0.09$
242	$41 \pm 6$	$37 \pm 5$	$3921 \pm 348$	$3731 \pm 288$	$8.78 \pm 0.09$	$8.71 \pm 0.08$
243	$77 \pm 12$	$72 \pm 9$	$3565 \pm 164$	$3606 \pm 129$	$8.83 \pm 0.05$	$8.83 \pm 0.04$
244	$39 \pm 7$	$45 \pm 7$	$3724 \pm 103$	$3720 \pm 105$	$8.72 \pm 0.05$	$8.75 \pm 0.04$
245	$19 \pm 7$	$20 \pm 6$	$4208 \pm 406$	$3047 \pm 614$	$8.66 \pm 0.12$	$8.40 \pm 0.19$
246	$249 \pm 26$	$285 \pm 24$	$3747 \pm 117$	$4107 \pm 95$	$9.15 \pm 0.04$	$9.26 \pm 0.03$
247	$46 \pm 12$	$1 \pm 0$	$3800 \pm 184$	$5847 \pm 428$	$8.78 \pm 0.07$	$8.37 \pm 0.09$
248	$119 \pm 8$	$127 \pm 9$	$4153 \pm 71$	$3907 \pm 84$	$9.07 \pm 0.02$	$9.03 \pm 0.02$
249	$29 \pm 13$	$42 \pm 13$	$3252 \pm 195$	$3123 \pm 228$	$8.53 \pm 0.11$	$8.58 \pm 0.10$
250	$101 \pm 11$	$152 \pm 10$	$4041 \pm 136$	$3707 \pm 103$	$9.01 \pm 0.04$	$9.03 \pm 0.03$
251	$37 \pm 8$	$52 \pm 8$	$3060 \pm 275$	$3409 \pm 181$	$8.53 \pm 0.10$	$8.70 \pm 0.06$
252	$45 \pm 12$	$48 \pm 11$	$3949 \pm 157$	$3865 \pm 149$	$8.80 \pm 0.07$	$8.80 \pm 0.06$
253	$40 \pm 11$	$41 \pm 11$	$3635 \pm 225$	$3116 \pm 300$	$8.70 \pm 0.08$	$8.58 \pm 0.10$
254	$124 \pm 14$	$113 \pm 12$	$3865 \pm 145$	$3635 \pm 153$	$9.01 \pm 0.04$	$8.94 \pm 0.04$
255	$138 \pm 34$	$134 \pm 29$	$4114 \pm 91$	$4250 \pm 80$	$9.09 \pm 0.06$	$9.12 \pm 0.05$
256	$163 \pm 79$	$138 \pm 71$	$3751 \pm 113$	$3259 \pm 196$	$9.05 \pm 0.12$	$8.89 \pm 0.13$
257	$32 \pm 14$	$39 \pm 10$	$3404 \pm 656$	$3345 \pm 504$	$8.60 \pm 0.20$	$8.63 \pm 0.14$
258	$105 \pm 15$	$108 \pm 11$	$3411 \pm 237$	$3635 \pm 144$	$8.87 \pm 0.07$	$8.93 \pm 0.04$
259	$1552 \pm 83$	$1458 \pm 77$	$2674 \pm 110$	$2863 \pm 94$	$9.28 \pm 0.04$	$9.32 \pm 0.03$
260	$968 \pm 63$	$877 \pm 58$	$3713 \pm 46$	$3764 \pm 42$	$9.45 \pm 0.02$	$9.44 \pm 0.02$
261	$107 \pm 12$	$107 \pm 11$	$3446 \pm 136$	$3405 \pm 129$	$8.88 \pm 0.04$	$8.87 \pm 0.04$



Table 2—Continued

Number	$L_{1450}$ $10^{44} \text{ erg s}^{-1}$		$\sigma_{\text{C IV}}$ $\text{km s}^{-1}$		$\log(M_{\text{BH}}/M_{\odot})$	
	HSN	LSN	HSN	LSN	HSN	LSN
262	$534 \pm 21$	$507 \pm 19$	$2887 \pm 75$	$2969 \pm 70$	$9.10 \pm 0.02$	$9.11 \pm 0.02$
263	$66 \pm 8$	$65 \pm 7$	$4179 \pm 108$	$3796 \pm 131$	$8.94 \pm 0.04$	$8.85 \pm 0.04$
264	$1124 \pm 78$	$1025 \pm 65$	$3040 \pm 45$	$3033 \pm 47$	$9.31 \pm 0.02$	$9.29 \pm 0.02$
265	$97 \pm 9$	$85 \pm 9$	$3263 \pm 121$	$3213 \pm 134$	$8.81 \pm 0.04$	$8.77 \pm 0.04$
266	$216 \pm 20$	$142 \pm 25$	$3504 \pm 145$	$3677 \pm 175$	$9.06 \pm 0.04$	$9.00 \pm 0.06$
267	$108 \pm 13$	$88 \pm 22$	$3774 \pm 220$	$3753 \pm 376$	$8.96 \pm 0.06$	$8.91 \pm 0.10$
268	$169 \pm 27$	$175 \pm 28$	$2939 \pm 192$	$3155 \pm 171$	$8.85 \pm 0.07$	$8.92 \pm 0.06$
269	$154 \pm 15$	$167 \pm 18$	$3398 \pm 247$	$3645 \pm 212$	$8.95 \pm 0.07$	$9.03 \pm 0.06$
270	$366 \pm 17$	$345 \pm 19$	$3420 \pm 49$	$3369 \pm 54$	$9.16 \pm 0.02$	$9.13 \pm 0.02$
271	$315 \pm 22$	$342 \pm 27$	$4058 \pm 76$	$3788 \pm 114$	$9.27 \pm 0.02$	$9.23 \pm 0.03$
272	$72 \pm 8$	$59 \pm 10$	$3914 \pm 136$	$3725 \pm 192$	$8.90 \pm 0.04$	$8.81 \pm 0.06$
273	$57 \pm 5$	$43 \pm 6$	$3684 \pm 263$	$3948 \pm 190$	$8.79 \pm 0.07$	$8.79 \pm 0.06$
274	$46 \pm 6$	$47 \pm 8$	$3539 \pm 97$	$3684 \pm 107$	$8.71 \pm 0.04$	$8.75 \pm 0.05$
275	$30 \pm 9$	$28 \pm 7$	$3921 \pm 178$	$3641 \pm 219$	$8.71 \pm 0.08$	$8.62 \pm 0.08$
276	$22 \pm 10$	$29 \pm 9$	$3766 \pm 286$	$3769 \pm 241$	$8.59 \pm 0.13$	$8.66 \pm 0.09$
277	$146 \pm 16$	$159 \pm 17$	$3274 \pm 152$	$3739 \pm 111$	$8.91 \pm 0.05$	$9.04 \pm 0.04$
278	$19 \pm 7$	$17 \pm 7$	$2693 \pm 538$	$2282 \pm 716$	$8.27 \pm 0.20$	$8.11 \pm 0.29$
279	$253 \pm 38$	$291 \pm 47$	$3410 \pm 92$	$3603 \pm 86$	$9.07 \pm 0.04$	$9.15 \pm 0.04$
280	$174 \pm 13$	$152 \pm 14$	$3663 \pm 128$	$3649 \pm 135$	$9.05 \pm 0.04$	$9.01 \pm 0.04$
281	$359 \pm 41$	$305 \pm 43$	$3641 \pm 167$	$3628 \pm 186$	$9.21 \pm 0.05$	$9.17 \pm 0.06$
282	$75 \pm 9$	$61 \pm 11$	$3041 \pm 337$	$3353 \pm 306$	$8.69 \pm 0.10$	$8.73 \pm 0.09$
283	$82 \pm 16$	$71 \pm 11$	$2968 \pm 609$	$3330 \pm 379$	$8.69 \pm 0.18$	$8.76 \pm 0.11$
284	$24 \pm 7$	$32 \pm 7$	$2911 \pm 590$	$3478 \pm 316$	$8.39 \pm 0.19$	$8.62 \pm 0.09$
285	$198 \pm 14$	$176 \pm 10$	$3449 \pm 159$	$3508 \pm 120$	$9.02 \pm 0.04$	$9.01 \pm 0.03$
286	$95 \pm 17$	$106 \pm 12$	$3770 \pm 167$	$4050 \pm 106$	$8.93 \pm 0.06$	$9.02 \pm 0.04$
287	$49 \pm 7$	$52 \pm 13$	$3440 \pm 357$	$2931 \pm 767$	$8.70 \pm 0.10$	$8.58 \pm 0.23$
288	$56 \pm 8$	$59 \pm 8$	$3477 \pm 274$	$2897 \pm 424$	$8.74 \pm 0.08$	$8.59 \pm 0.13$
289	$145 \pm 9$	$129 \pm 9$	$3449 \pm 142$	$3700 \pm 122$	$8.95 \pm 0.04$	$8.99 \pm 0.03$
290	$91 \pm 9$	$80 \pm 9$	$3568 \pm 120$	$3371 \pm 141$	$8.88 \pm 0.04$	$8.80 \pm 0.05$

Table 2—Continued

Number	$L_{1450}$ $10^{44} \text{ erg s}^{-1}$		$\sigma_{\text{C IV}}$ $\text{km s}^{-1}$		$\log(M_{\text{BH}}/M_{\odot})$	
	HSN	LSN	HSN	LSN	HSN	LSN
291	$26 \pm 7$	$30 \pm 7$	$3264 \pm 312$	$3096 \pm 318$	$8.51 \pm 0.11$	$8.50 \pm 0.11$
292	$38 \pm 7$	$37 \pm 6$	$3609 \pm 291$	$3161 \pm 390$	$8.69 \pm 0.08$	$8.56 \pm 0.11$
293	$90 \pm 8$	$90 \pm 9$	$3366 \pm 114$	$2990 \pm 172$	$8.82 \pm 0.04$	$8.72 \pm 0.06$
294	$90 \pm 10$	$84 \pm 11$	$3302 \pm 146$	$3293 \pm 158$	$8.80 \pm 0.05$	$8.79 \pm 0.05$
295	$67 \pm 21$	$65 \pm 21$	$3193 \pm 514$	$4257 \pm 216$	$8.71 \pm 0.16$	$8.95 \pm 0.09$
296	$61 \pm 8$	$60 \pm 8$	$3069 \pm 192$	$3659 \pm 123$	$8.65 \pm 0.06$	$8.80 \pm 0.04$
297	$68 \pm 9$	$66 \pm 7$	$3357 \pm 146$	$3498 \pm 112$	$8.76 \pm 0.05$	$8.78 \pm 0.04$
298	$18 \pm 6$	$20 \pm 6$	$3501 \pm 309$	$3137 \pm 414$	$8.49 \pm 0.11$	$8.41 \pm 0.14$
299	$57 \pm 15$	$64 \pm 17$	$3433 \pm 282$	$3746 \pm 222$	$8.74 \pm 0.09$	$8.84 \pm 0.08$
300	$374 \pm 21$	$342 \pm 18$	$3295 \pm 92$	$3187 \pm 98$	$9.13 \pm 0.03$	$9.08 \pm 0.03$
301	$39 \pm 7$	$40 \pm 11$	$3773 \pm 162$	$3793 \pm 237$	$8.73 \pm 0.06$	$8.74 \pm 0.08$
302	$159 \pm 16$	$172 \pm 23$	$2705 \pm 163$	$3012 \pm 188$	$8.76 \pm 0.06$	$8.87 \pm 0.06$
303	$83 \pm 6$	$88 \pm 9$	$3748 \pm 129$	$3629 \pm 251$	$8.90 \pm 0.04$	$8.88 \pm 0.06$
304	$12 \pm 5$	$4 \pm 6$	$3885 \pm 223$	$3212 \pm 615$	$8.49 \pm 0.11$	$8.08 \pm 0.36$
305	$60 \pm 12$	$54 \pm 15$	$2755 \pm 373$	$3113 \pm 424$	$8.56 \pm 0.13$	$8.64 \pm 0.14$
306	$125 \pm 13$	$125 \pm 16$	$3553 \pm 109$	$3523 \pm 159$	$8.94 \pm 0.04$	$8.94 \pm 0.05$
307	$28 \pm 5$	$29 \pm 7$	$3230 \pm 187$	$3469 \pm 250$	$8.52 \pm 0.06$	$8.59 \pm 0.08$
308	$313 \pm 44$	$358 \pm 46$	$3671 \pm 120$	$3799 \pm 85$	$9.18 \pm 0.04$	$9.24 \pm 0.04$
309	$50 \pm 5$	$45 \pm 6$	$3440 \pm 168$	$3750 \pm 161$	$8.70 \pm 0.05$	$8.76 \pm 0.05$
310	$33 \pm 5$	$25 \pm 7$	$4266 \pm 165$	$3100 \pm 621$	$8.80 \pm 0.05$	$8.46 \pm 0.19$
311	$72 \pm 10$	$55 \pm 11$	$3307 \pm 209$	$987 \pm 597$	$8.75 \pm 0.06$	$7.64 \pm 0.53$
312	$27 \pm 6$	$21 \pm 6$	$3687 \pm 196$	$3391 \pm 284$	$8.63 \pm 0.07$	$8.50 \pm 0.10$
313	$41 \pm 8$	$40 \pm 11$	$3053 \pm 318$	$3242 \pm 415$	$8.56 \pm 0.10$	$8.61 \pm 0.13$
314	$34 \pm 8$	$13 \pm 5$	$4154 \pm 178$	$3878 \pm 876$	$8.78 \pm 0.07$	$8.51 \pm 0.22$
315	$46 \pm 7$	$42 \pm 9$	$3626 \pm 483$	$2871 \pm 745$	$8.73 \pm 0.12$	$8.51 \pm 0.23$
316	$310 \pm 12$	$301 \pm 12$	$3550 \pm 42$	$3474 \pm 48$	$9.15 \pm 0.01$	$9.13 \pm 0.02$
317	$41 \pm 5$	$43 \pm 8$	$3975 \pm 95$	$3989 \pm 131$	$8.78 \pm 0.04$	$8.80 \pm 0.05$
318	$35 \pm 5$	$36 \pm 8$	$3468 \pm 438$	$3693 \pm 517$	$8.63 \pm 0.12$	$8.69 \pm 0.13$
319	$67 \pm 9$	$64 \pm 13$	$3903 \pm 125$	$4177 \pm 180$	$8.88 \pm 0.04$	$8.93 \pm 0.06$

Table 2—Continued

Number	$L_{1450}$ $10^{44} \text{ erg s}^{-1}$		$\sigma_{\text{C IV}}$ $\text{km s}^{-1}$		$\log(M_{\text{BH}}/M_{\odot})$	
	HSN	LSN	HSN	LSN	HSN	LSN
320	$52 \pm 5$	$50 \pm 8$	$2569 \pm 277$	$3246 \pm 243$	$8.46 \pm 0.10$	$8.66 \pm 0.08$
321	$611 \pm 20$	$682 \pm 18$	$4022 \pm 94$	$3940 \pm 98$	$9.42 \pm 0.02$	$9.42 \pm 0.02$
322	$15 \pm 5$	$16 \pm 5$	$2869 \pm 552$	$3323 \pm 318$	$8.28 \pm 0.18$	$8.41 \pm 0.11$
323	$71 \pm 12$	$74 \pm 12$	$3614 \pm 278$	$4254 \pm 183$	$8.83 \pm 0.08$	$8.98 \pm 0.05$
324	$27 \pm 7$	$26 \pm 7$	$3968 \pm 180$	$3538 \pm 311$	$8.69 \pm 0.07$	$8.58 \pm 0.10$
325	$22 \pm 7$	$22 \pm 8$	$3665 \pm 250$	$3680 \pm 324$	$8.58 \pm 0.10$	$8.58 \pm 0.11$
326	$30 \pm 5$	$26 \pm 6$	$2557 \pm 568$	$1841 \pm 657$	$8.34 \pm 0.20$	$8.02 \pm 0.31$
327	$73 \pm 14$	$74 \pm 17$	$3343 \pm 90$	$3212 \pm 131$	$8.77 \pm 0.05$	$8.74 \pm 0.06$
328	$49 \pm 8$	$46 \pm 10$	$4714 \pm 166$	$4866 \pm 184$	$8.98 \pm 0.05$	$8.99 \pm 0.06$
329	$69 \pm 9$	$66 \pm 10$	$2438 \pm 277$	$2746 \pm 244$	$8.48 \pm 0.10$	$8.57 \pm 0.08$
330	$83 \pm 19$	$89 \pm 19$	$3833 \pm 179$	$3702 \pm 199$	$8.92 \pm 0.07$	$8.90 \pm 0.07$
331	$44 \pm 9$	$39 \pm 10$	$4467 \pm 169$	$3823 \pm 464$	$8.90 \pm 0.06$	$8.74 \pm 0.12$
332	$80 \pm 15$	$90 \pm 17$	$3570 \pm 166$	$3178 \pm 319$	$8.85 \pm 0.06$	$8.77 \pm 0.10$
333	$62 \pm 12$	$67 \pm 14$	$3488 \pm 379$	$3752 \pm 339$	$8.77 \pm 0.11$	$8.85 \pm 0.09$
334	$34 \pm 7$	$32 \pm 9$	$3529 \pm 309$	$3957 \pm 258$	$8.64 \pm 0.09$	$8.73 \pm 0.09$
335	$77 \pm 9$	$83 \pm 11$	$3540 \pm 170$	$3477 \pm 250$	$8.83 \pm 0.05$	$8.83 \pm 0.07$
336	$38 \pm 7$	$38 \pm 8$	$3518 \pm 184$	$3284 \pm 341$	$8.66 \pm 0.06$	$8.60 \pm 0.10$
337	$43 \pm 12$	$28 \pm 13$	$3473 \pm 182$	$2586 \pm 489$	$8.68 \pm 0.08$	$8.32 \pm 0.20$
338	$88 \pm 9$	$98 \pm 11$	$3618 \pm 130$	$3516 \pm 158$	$8.88 \pm 0.04$	$8.88 \pm 0.05$
339	$87 \pm 19$	$89 \pm 27$	$4204 \pm 98$	$3913 \pm 163$	$9.01 \pm 0.06$	$8.95 \pm 0.08$
340	$92 \pm 7$	$97 \pm 8$	$3800 \pm 75$	$3564 \pm 106$	$8.93 \pm 0.03$	$8.89 \pm 0.03$
341	$107 \pm 11$	$108 \pm 12$	$3293 \pm 121$	$3208 \pm 140$	$8.84 \pm 0.04$	$8.82 \pm 0.05$
342	$12 \pm 6$	$17 \pm 7$	$4147 \pm 202$	$4308 \pm 224$	$8.55 \pm 0.13$	$8.66 \pm 0.11$
343	$16 \pm 5$	$19 \pm 6$	$4250 \pm 187$	$3633 \pm 375$	$8.64 \pm 0.09$	$8.53 \pm 0.12$
344	$42 \pm 7$	$46 \pm 8$	$3623 \pm 111$	$3820 \pm 97$	$8.71 \pm 0.05$	$8.78 \pm 0.05$
345	$77 \pm 14$	$81 \pm 14$	$3576 \pm 304$	$3998 \pm 235$	$8.84 \pm 0.09$	$8.95 \pm 0.07$
346	$82 \pm 6$	$93 \pm 7$	$3404 \pm 144$	$2918 \pm 211$	$8.81 \pm 0.04$	$8.71 \pm 0.07$
347	$71 \pm 7$	$82 \pm 7$	$3491 \pm 96$	$3248 \pm 108$	$8.80 \pm 0.03$	$8.77 \pm 0.04$
348	$283 \pm 17$	$306 \pm 19$	$3430 \pm 46$	$3392 \pm 46$	$9.10 \pm 0.02$	$9.11 \pm 0.02$

Table 2—Continued

Number	$L_{1450}$ $10^{44} \text{ erg s}^{-1}$		$\sigma_{\text{C IV}}$ $\text{km s}^{-1}$		$\log(M_{\text{BH}}/M_{\odot})$	
	HSN	LSN	HSN	LSN	HSN	LSN
349	$67 \pm 6$	$60 \pm 6$	$3629 \pm 140$	$3323 \pm 180$	$8.82 \pm 0.04$	$8.72 \pm 0.05$
350	$101 \pm 7$	$89 \pm 7$	$3564 \pm 140$	$3470 \pm 181$	$8.90 \pm 0.04$	$8.85 \pm 0.05$
351	$150 \pm 12$	$152 \pm 12$	$3431 \pm 183$	$3277 \pm 187$	$8.95 \pm 0.05$	$8.92 \pm 0.05$
352	$59 \pm 6$	$54 \pm 5$	$2721 \pm 144$	$2926 \pm 112$	$8.54 \pm 0.05$	$8.58 \pm 0.04$
353	$149 \pm 9$	$155 \pm 10$	$2931 \pm 70$	$3154 \pm 67$	$8.82 \pm 0.03$	$8.89 \pm 0.02$
354	$196 \pm 26$	$240 \pm 47$	$3223 \pm 200$	$3720 \pm 237$	$8.96 \pm 0.06$	$9.13 \pm 0.07$
355	$68 \pm 14$	$76 \pm 16$	$2840 \pm 355$	$2478 \pm 463$	$8.61 \pm 0.12$	$8.52 \pm 0.17$
356	$83 \pm 15$	$94 \pm 18$	$3633 \pm 238$	$3156 \pm 442$	$8.87 \pm 0.07$	$8.78 \pm 0.13$
357	$24 \pm 9$	$21 \pm 9$	$2619 \pm 702$	$2868 \pm 746$	$8.30 \pm 0.25$	$8.35 \pm 0.25$
358	$40 \pm 7$	$38 \pm 11$	$3996 \pm 309$	$4463 \pm 438$	$8.79 \pm 0.08$	$8.87 \pm 0.11$
359	$49 \pm 44$	$18 \pm 51$	$3262 \pm 361$	$3280 \pm 406$	$8.65 \pm 0.23$	$8.43 \pm 0.66$
360	$17 \pm 9$	$1 \pm 0$	$2482 \pm 744$	$7573 \pm 613$	$8.18 \pm 0.29$	$8.51 \pm 0.11$
361	$37 \pm 7$	$35 \pm 8$	$3613 \pm 290$	$4215 \pm 199$	$8.68 \pm 0.08$	$8.80 \pm 0.07$
362	$101 \pm 12$	$117 \pm 12$	$3928 \pm 134$	$3639 \pm 225$	$8.98 \pm 0.04$	$8.95 \pm 0.06$
363	$34 \pm 9$	$17 \pm 10$	$3785 \pm 277$	$2924 \pm 681$	$8.70 \pm 0.09$	$8.32 \pm 0.25$
364	$220 \pm 30$	$227 \pm 32$	$3293 \pm 177$	$2930 \pm 269$	$9.01 \pm 0.06$	$8.91 \pm 0.09$
365	$64 \pm 9$	$85 \pm 11$	$3395 \pm 106$	$2950 \pm 176$	$8.75 \pm 0.04$	$8.69 \pm 0.06$
366	$77 \pm 14$	$58 \pm 14$	$3632 \pm 277$	$3048 \pm 508$	$8.85 \pm 0.08$	$8.64 \pm 0.16$
367	$121 \pm 11$	$126 \pm 12$	$3918 \pm 115$	$3900 \pm 125$	$9.02 \pm 0.03$	$9.03 \pm 0.04$
368	$212 \pm 18$	$233 \pm 20$	$3617 \pm 182$	$3458 \pm 225$	$9.08 \pm 0.05$	$9.06 \pm 0.06$
369	$20 \pm 7$	$17 \pm 8$	$3869 \pm 303$	$3259 \pm 513$	$8.60 \pm 0.11$	$8.42 \pm 0.18$
370	$419 \pm 81$	$437 \pm 101$	$3830 \pm 136$	$3585 \pm 189$	$9.29 \pm 0.05$	$9.24 \pm 0.07$
371	$37 \pm 6$	$36 \pm 7$	$4325 \pm 190$	$3910 \pm 252$	$8.83 \pm 0.06$	$8.74 \pm 0.07$
372	$61 \pm 11$	$47 \pm 14$	$3320 \pm 499$	$3532 \pm 561$	$8.72 \pm 0.14$	$8.71 \pm 0.15$
373	$63 \pm 13$	$9 \pm 1$	$3251 \pm 864$	$6640 \pm 484$	$8.71 \pm 0.24$	$8.89 \pm 0.08$
374	$22 \pm 10$	$21 \pm 14$	$3597 \pm 363$	$2884 \pm 582$	$8.56 \pm 0.14$	$8.36 \pm 0.24$
375	$41 \pm 7$	$44 \pm 11$	$3254 \pm 201$	$3110 \pm 396$	$8.61 \pm 0.07$	$8.59 \pm 0.13$
376	$77 \pm 12$	$87 \pm 22$	$1489 \pm 623$	$3461 \pm 397$	$8.08 \pm 0.37$	$8.84 \pm 0.12$
377	$167 \pm 15$	$179 \pm 25$	$4006 \pm 177$	$3143 \pm 643$	$9.11 \pm 0.04$	$8.92 \pm 0.18$

Table 2—Continued

Number	$L_{1450}$ $10^{44} \text{ erg s}^{-1}$		$\sigma_{\text{C IV}}$ $\text{km s}^{-1}$		$\log(M_{\text{BH}}/M_{\odot})$	
	HSN	LSN	HSN	LSN	HSN	LSN
378	$157 \pm 10$	$159 \pm 16$	$4156 \pm 58$	$4019 \pm 99$	$9.13 \pm 0.02$	$9.11 \pm 0.03$
379	$38 \pm 6$	$50 \pm 10$	$3249 \pm 241$	$3634 \pm 367$	$8.59 \pm 0.07$	$8.75 \pm 0.10$
380	$47 \pm 4$	$53 \pm 9$	$3313 \pm 121$	$2386 \pm 442$	$8.66 \pm 0.04$	$8.40 \pm 0.17$
381	$82 \pm 7$	$82 \pm 13$	$3482 \pm 60$	$3488 \pm 111$	$8.83 \pm 0.02$	$8.83 \pm 0.05$
382	$43 \pm 7$	$25 \pm 11$	$3774 \pm 170$	$3751 \pm 304$	$8.75 \pm 0.06$	$8.62 \pm 0.13$
383	$51 \pm 5$	$67 \pm 10$	$3754 \pm 134$	$3780 \pm 178$	$8.79 \pm 0.04$	$8.85 \pm 0.05$
384	$77 \pm 10$	$71 \pm 18$	$3449 \pm 81$	$3432 \pm 156$	$8.81 \pm 0.04$	$8.78 \pm 0.07$
385	$67 \pm 6$	$36 \pm 13$	$3458 \pm 296$	$2949 \pm 744$	$8.78 \pm 0.08$	$8.50 \pm 0.23$
386	$70 \pm 8$	$81 \pm 16$	$3708 \pm 109$	$3897 \pm 202$	$8.85 \pm 0.04$	$8.92 \pm 0.07$
387	$96 \pm 8$	$86 \pm 13$	$2932 \pm 275$	$3724 \pm 257$	$8.72 \pm 0.08$	$8.90 \pm 0.07$
388	$113 \pm 17$	$109 \pm 23$	$4002 \pm 197$	$4848 \pm 166$	$9.02 \pm 0.06$	$9.18 \pm 0.06$
389	$245 \pm 17$	$216 \pm 22$	$3460 \pm 99$	$3375 \pm 167$	$9.07 \pm 0.03$	$9.02 \pm 0.05$
390	$22 \pm 5$	$23 \pm 7$	$1659 \pm 562$	$1904 \pm 586$	$7.89 \pm 0.30$	$8.02 \pm 0.28$
391	$105 \pm 11$	$95 \pm 15$	$2797 \pm 337$	$2788 \pm 522$	$8.70 \pm 0.11$	$8.67 \pm 0.17$
392	$86 \pm 11$	$96 \pm 15$	$3596 \pm 273$	$3752 \pm 277$	$8.87 \pm 0.07$	$8.93 \pm 0.07$
393	$119 \pm 10$	$151 \pm 16$	$3426 \pm 139$	$3106 \pm 295$	$8.90 \pm 0.04$	$8.87 \pm 0.09$
394	$71 \pm 78$	$180 \pm 108$	$3133 \pm 208$	$3275 \pm 234$	$8.70 \pm 0.26$	$8.96 \pm 0.15$
395	$128 \pm 9$	$136 \pm 11$	$3774 \pm 76$	$3996 \pm 89$	$9.00 \pm 0.02$	$9.06 \pm 0.03$
396	$45 \pm 4$	$60 \pm 6$	$4225 \pm 314$	$3408 \pm 697$	$8.86 \pm 0.07$	$8.74 \pm 0.18$
397	$128 \pm 48$	$123 \pm 60$	$3233 \pm 215$	$3684 \pm 183$	$8.87 \pm 0.10$	$8.97 \pm 0.12$
398	$28 \pm 6$	$31 \pm 8$	$3970 \pm 317$	$4026 \pm 342$	$8.70 \pm 0.09$	$8.73 \pm 0.10$
399	$32 \pm 4$	$25 \pm 5$	$3464 \pm 175$	$3635 \pm 243$	$8.61 \pm 0.06$	$8.59 \pm 0.08$
400	$139 \pm 9$	$121 \pm 9$	$3581 \pm 121$	$3792 \pm 112$	$8.98 \pm 0.03$	$8.99 \pm 0.03$
401	$115 \pm 11$	$122 \pm 16$	$4068 \pm 106$	$3617 \pm 211$	$9.04 \pm 0.03$	$8.95 \pm 0.06$
402	$45 \pm 5$	$51 \pm 7$	$3700 \pm 92$	$3987 \pm 95$	$8.75 \pm 0.03$	$8.84 \pm 0.04$
403	$36 \pm 5$	$37 \pm 8$	$3673 \pm 247$	$3270 \pm 482$	$8.68 \pm 0.07$	$8.59 \pm 0.14$
404	$66 \pm 5$	$87 \pm 7$	$3423 \pm 112$	$3413 \pm 137$	$8.76 \pm 0.03$	$8.82 \pm 0.04$
405	$87 \pm 9$	$85 \pm 12$	$4307 \pm 131$	$4434 \pm 140$	$9.03 \pm 0.04$	$9.05 \pm 0.04$
406	$23 \pm 3$	$25 \pm 4$	$2961 \pm 545$	$3044 \pm 643$	$8.40 \pm 0.16$	$8.44 \pm 0.19$

Table 2—Continued

Number	$L_{1450}$ $10^{44} \text{ erg s}^{-1}$		$\sigma_{\text{C IV}}$ $\text{km s}^{-1}$		$\log(M_{\text{BH}}/M_{\odot})$	
	HSN	LSN	HSN	LSN	HSN	LSN
407	$99 \pm 8$	$109 \pm 8$	$3343 \pm 133$	$3002 \pm 190$	$8.84 \pm 0.04$	$8.77 \pm 0.06$
408	$812 \pm 52$	$772 \pm 61$	$3483 \pm 94$	$3000 \pm 190$	$9.36 \pm 0.03$	$9.22 \pm 0.06$
409	$60 \pm 7$	$56 \pm 9$	$3171 \pm 312$	$1622 \pm 687$	$8.68 \pm 0.09$	$8.08 \pm 0.37$
410	$252 \pm 24$	$273 \pm 31$	$3602 \pm 110$	$2944 \pm 260$	$9.12 \pm 0.04$	$8.96 \pm 0.08$
411	$1181 \pm 40$	$1209 \pm 49$	$3961 \pm 25$	$3970 \pm 36$	$9.55 \pm 0.01$	$9.56 \pm 0.01$
412	$441 \pm 35$	$418 \pm 41$	$2621 \pm 169$	$2754 \pm 194$	$8.97 \pm 0.06$	$9.00 \pm 0.07$
413	$91 \pm 10$	$92 \pm 12$	$3801 \pm 90$	$3843 \pm 103$	$8.93 \pm 0.03$	$8.94 \pm 0.04$
414	$42 \pm 7$	$43 \pm 12$	$2817 \pm 382$	$3401 \pm 384$	$8.49 \pm 0.12$	$8.66 \pm 0.12$
415	$409 \pm 30$	$359 \pm 44$	$4417 \pm 45$	$4107 \pm 100$	$9.41 \pm 0.02$	$9.31 \pm 0.04$
416	$94 \pm 42$	$88 \pm 62$	$3392 \pm 388$	$4408 \pm 194$	$8.84 \pm 0.14$	$9.05 \pm 0.17$
417	$26 \pm 6$	$28 \pm 8$	$3673 \pm 537$	$3463 \pm 564$	$8.62 \pm 0.14$	$8.58 \pm 0.16$
418	$159 \pm 12$	$145 \pm 13$	$3849 \pm 103$	$3845 \pm 124$	$9.07 \pm 0.03$	$9.05 \pm 0.04$
419	$99 \pm 10$	$91 \pm 15$	$3345 \pm 160$	$3444 \pm 225$	$8.84 \pm 0.05$	$8.84 \pm 0.07$
420	$121 \pm 10$	$103 \pm 12$	$3959 \pm 76$	$4111 \pm 84$	$9.03 \pm 0.03$	$9.03 \pm 0.03$
421	$95 \pm 8$	$72 \pm 9$	$4522 \pm 150$	$4609 \pm 176$	$9.09 \pm 0.04$	$9.04 \pm 0.05$
422	$163 \pm 11$	$161 \pm 17$	$3074 \pm 126$	$3088 \pm 189$	$8.88 \pm 0.04$	$8.88 \pm 0.06$
423	$236 \pm 48$	$218 \pm 65$	$2712 \pm 187$	$3335 \pm 135$	$8.85 \pm 0.08$	$9.02 \pm 0.08$
424	$33 \pm 5$	$38 \pm 8$	$2988 \pm 347$	$2058 \pm 683$	$8.49 \pm 0.11$	$8.20 \pm 0.29$
425	$67 \pm 6$	$67 \pm 8$	$3201 \pm 420$	$1864 \pm 796$	$8.71 \pm 0.12$	$8.24 \pm 0.37$
426	$133 \pm 12$	$127 \pm 14$	$3683 \pm 127$	$4021 \pm 136$	$8.99 \pm 0.04$	$9.05 \pm 0.04$
427	$141 \pm 14$	$148 \pm 20$	$2464 \pm 413$	$3190 \pm 423$	$8.65 \pm 0.15$	$8.89 \pm 0.12$
428	$151 \pm 23$	$157 \pm 48$	$4007 \pm 176$	$4121 \pm 326$	$9.09 \pm 0.05$	$9.12 \pm 0.10$
429	$201 \pm 14$	$154 \pm 23$	$4075 \pm 98$	$3752 \pm 224$	$9.17 \pm 0.03$	$9.04 \pm 0.06$
430	$41 \pm 8$	$37 \pm 15$	$2950 \pm 680$	$2842 \pm 899$	$8.53 \pm 0.21$	$8.47 \pm 0.29$
431	$122 \pm 10$	$112 \pm 17$	$4068 \pm 59$	$3657 \pm 140$	$9.06 \pm 0.02$	$8.94 \pm 0.05$
432	$46 \pm 7$	$54 \pm 14$	$3821 \pm 161$	$3510 \pm 457$	$8.78 \pm 0.05$	$8.74 \pm 0.13$
433	$86 \pm 9$	$69 \pm 18$	$3904 \pm 131$	$3453 \pm 565$	$8.94 \pm 0.04$	$8.78 \pm 0.16$
434	$246 \pm 18$	$233 \pm 40$	$3308 \pm 148$	$3312 \pm 281$	$9.04 \pm 0.04$	$9.03 \pm 0.08$
435	$124 \pm 81$	$141 \pm 145$	$2365 \pm 536$	$3140 \pm 602$	$8.59 \pm 0.25$	$8.86 \pm 0.29$

Table 2—Continued

Number	$L_{1450}$ $10^{44} \text{ erg s}^{-1}$		$\sigma_{\text{C IV}}$ $\text{km s}^{-1}$		$\log(M_{\text{BH}}/M_{\odot})$	
	HSN	LSN	HSN	LSN	HSN	LSN
436	$263 \pm 36$	$309 \pm 80$	$3976 \pm 138$	$4298 \pm 209$	$9.21 \pm 0.04$	$9.32 \pm 0.07$
437	$105 \pm 9$	$95 \pm 19$	$2913 \pm 109$	$3234 \pm 169$	$8.73 \pm 0.04$	$8.80 \pm 0.07$
438	$68 \pm 8$	$49 \pm 16$	$2963 \pm 154$	$3027 \pm 270$	$8.65 \pm 0.05$	$8.59 \pm 0.11$
439	$41 \pm 6$	$57 \pm 16$	$3328 \pm 161$	$4005 \pm 200$	$8.63 \pm 0.06$	$8.87 \pm 0.08$
440	$72 \pm 9$	$96 \pm 19$	$4077 \pm 114$	$4058 \pm 225$	$8.94 \pm 0.04$	$9.00 \pm 0.07$
441	$62 \pm 6$	$71 \pm 15$	$3557 \pm 165$	$3186 \pm 468$	$8.78 \pm 0.05$	$8.72 \pm 0.14$
442	$77 \pm 14$	$112 \pm 25$	$3915 \pm 192$	$4212 \pm 287$	$8.92 \pm 0.06$	$9.07 \pm 0.08$
443	$186 \pm 59$	$158 \pm 91$	$3110 \pm 245$	$2354 \pm 573$	$8.92 \pm 0.10$	$8.64 \pm 0.25$
444	$91 \pm 24$	$76 \pm 38$	$3383 \pm 309$	$2994 \pm 585$	$8.83 \pm 0.10$	$8.68 \pm 0.21$
445	$105 \pm 80$	$47 \pm 202$	$3969 \pm 297$	$4158 \pm 349$	$9.00 \pm 0.19$	$8.86 \pm 0.98$
446	$63 \pm 103$	$190 \pm 245$	$2440 \pm 715$	$2779 \pm 617$	$8.46 \pm 0.45$	$8.83 \pm 0.35$
447	$39 \pm 9$	$13 \pm 15$	$3261 \pm 415$	$3290 \pm 781$	$8.61 \pm 0.12$	$8.36 \pm 0.34$
448	$85 \pm 10$	$97 \pm 17$	$4265 \pm 101$	$4425 \pm 158$	$9.01 \pm 0.04$	$9.08 \pm 0.05$
449	$168 \pm 19$	$165 \pm 30$	$3611 \pm 131$	$3972 \pm 158$	$9.03 \pm 0.04$	$9.10 \pm 0.05$
450	$50 \pm 11$	$6 \pm 2$	$3226 \pm 426$	$6213 \pm 574$	$8.65 \pm 0.13$	$8.73 \pm 0.13$
451	$83 \pm 23$	$141 \pm 40$	$3797 \pm 260$	$3853 \pm 423$	$8.91 \pm 0.09$	$9.04 \pm 0.12$
452	$71 \pm 33$	$77 \pm 62$	$3211 \pm 375$	$3703 \pm 321$	$8.72 \pm 0.15$	$8.87 \pm 0.20$
453	$22 \pm 9$	$21 \pm 16$	$3594 \pm 368$	$3732 \pm 679$	$8.56 \pm 0.13$	$8.57 \pm 0.24$
454	$92 \pm 8$	$90 \pm 10$	$3578 \pm 114$	$3874 \pm 117$	$8.88 \pm 0.04$	$8.94 \pm 0.04$
455	$26 \pm 9$	$31 \pm 12$	$3432 \pm 521$	$4069 \pm 415$	$8.55 \pm 0.16$	$8.74 \pm 0.13$
456	$44 \pm 8$	$21 \pm 15$	$3643 \pm 264$	$4107 \pm 276$	$8.73 \pm 0.08$	$8.66 \pm 0.18$
457	$94 \pm 67$	$97 \pm 94$	$3501 \pm 156$	$3784 \pm 183$	$8.86 \pm 0.17$	$8.94 \pm 0.23$
458	$25 \pm 10$	$1 \pm 0$	$4208 \pm 174$	$5840 \pm 1391$	$8.73 \pm 0.10$	$8.35 \pm 0.23$
459	$172 \pm 50$	$147 \pm 93$	$2646 \pm 491$	$3635 \pm 472$	$8.76 \pm 0.17$	$9.00 \pm 0.18$
460	$17 \pm 7$	$22 \pm 10$	$3456 \pm 349$	$4237 \pm 419$	$8.46 \pm 0.13$	$8.70 \pm 0.14$
461	$66 \pm 7$	$65 \pm 11$	$4157 \pm 152$	$4489 \pm 255$	$8.94 \pm 0.04$	$9.00 \pm 0.06$
462	$73 \pm 9$	$71 \pm 14$	$3089 \pm 226$	$3462 \pm 303$	$8.70 \pm 0.07$	$8.79 \pm 0.09$
463	$35 \pm 8$	$35 \pm 13$	$3216 \pm 125$	$3123 \pm 244$	$8.57 \pm 0.06$	$8.54 \pm 0.11$
464	$129 \pm 16$	$125 \pm 23$	$3600 \pm 124$	$3636 \pm 168$	$8.96 \pm 0.04$	$8.96 \pm 0.06$

Table 2—Continued

Number	$L_{1450}$ $10^{44} \text{ erg s}^{-1}$		$\sigma_{\text{C IV}}$ $\text{km s}^{-1}$		$\log(M_{\text{BH}}/M_{\odot})$	
	HSN	LSN	HSN	LSN	HSN	LSN
465	$336 \pm 24$	$381 \pm 34$	$3805 \pm 120$	$3683 \pm 174$	$9.23 \pm 0.03$	$9.23 \pm 0.05$
466	$35 \pm 9$	$39 \pm 17$	$3232 \pm 322$	$3798 \pm 502$	$8.57 \pm 0.11$	$8.74 \pm 0.15$
467	$414 \pm 44$	$338 \pm 70$	$3280 \pm 155$	$3276 \pm 251$	$9.15 \pm 0.05$	$9.10 \pm 0.08$
468	$111 \pm 13$	$76 \pm 23$	$4159 \pm 158$	$3769 \pm 503$	$9.05 \pm 0.04$	$8.88 \pm 0.14$
469	$99 \pm 10$	$104 \pm 17$	$3661 \pm 78$	$3446 \pm 173$	$8.92 \pm 0.03$	$8.87 \pm 0.06$
470	$130 \pm 11$	$75 \pm 16$	$3598 \pm 192$	$3278 \pm 525$	$8.96 \pm 0.05$	$8.76 \pm 0.15$
471	$263 \pm 23$	$251 \pm 51$	$4216 \pm 80$	$3123 \pm 469$	$9.26 \pm 0.03$	$8.99 \pm 0.14$
472	$673 \pm 39$	$679 \pm 86$	$3645 \pm 101$	$3403 \pm 289$	$9.35 \pm 0.03$	$9.29 \pm 0.08$
473	$423 \pm 55$	$399 \pm 142$	$3233 \pm 157$	$3847 \pm 230$	$9.14 \pm 0.05$	$9.28 \pm 0.10$
474	$83 \pm 13$	$78 \pm 31$	$3817 \pm 185$	$4221 \pm 382$	$8.91 \pm 0.06$	$8.99 \pm 0.12$
475	$188 \pm 17$	$164 \pm 36$	$3359 \pm 219$	$3995 \pm 286$	$8.99 \pm 0.06$	$9.11 \pm 0.08$
476	$156 \pm 16$	$128 \pm 32$	$2463 \pm 378$	$2727 \pm 597$	$8.68 \pm 0.14$	$8.72 \pm 0.20$
477	$109 \pm 11$	$76 \pm 25$	$3593 \pm 142$	$3513 \pm 616$	$8.92 \pm 0.04$	$8.82 \pm 0.17$
478	$48 \pm 52$	$105 \pm 170$	$3726 \pm 185$	$4274 \pm 430$	$8.76 \pm 0.25$	$9.06 \pm 0.38$
479	$67 \pm 6$	$71 \pm 16$	$4255 \pm 101$	$3009 \pm 710$	$8.96 \pm 0.03$	$8.67 \pm 0.21$
480	$95 \pm 10$	$52 \pm 8$	$3343 \pm 334$	$3250 \pm 295$	$8.83 \pm 0.09$	$8.66 \pm 0.09$
481	$37 \pm 7$	$25 \pm 5$	$3158 \pm 450$	$3257 \pm 359$	$8.56 \pm 0.13$	$8.51 \pm 0.11$
482	$66 \pm 8$	$66 \pm 6$	$3647 \pm 157$	$3771 \pm 128$	$8.82 \pm 0.05$	$8.85 \pm 0.04$
483	$92 \pm 14$	$98 \pm 13$	$3789 \pm 206$	$3904 \pm 173$	$8.93 \pm 0.06$	$8.97 \pm 0.05$
484	$35 \pm 12$	$32 \pm 10$	$2583 \pm 706$	$3545 \pm 332$	$8.38 \pm 0.25$	$8.63 \pm 0.11$
485	$288 \pm ***$	$277 \pm 18$	$3521 \pm 6404$	$3660 \pm 113$	$9.13 \pm 1.84$	$9.15 \pm 0.03$
486	$62 \pm 7$	$52 \pm 7$	$3570 \pm 169$	$3650 \pm 158$	$8.79 \pm 0.05$	$8.77 \pm 0.05$
487	$21 \pm 8$	$37 \pm 6$	$4398 \pm 326$	$4723 \pm 136$	$8.72 \pm 0.11$	$8.92 \pm 0.05$
488	$105 \pm 40$	$170 \pm 35$	$4020 \pm 192$	$3155 \pm 494$	$9.01 \pm 0.10$	$8.91 \pm 0.14$
489	$82 \pm 15$	$83 \pm 14$	$3431 \pm 129$	$3095 \pm 148$	$8.82 \pm 0.06$	$8.73 \pm 0.06$
490	$352 \pm 49$	$365 \pm 49$	$3694 \pm 114$	$3430 \pm 134$	$9.22 \pm 0.04$	$9.16 \pm 0.05$
491	$138 \pm 9$	$146 \pm 10$	$3781 \pm 160$	$4309 \pm 99$	$9.02 \pm 0.04$	$9.15 \pm 0.03$
492	$63 \pm 7$	$64 \pm 7$	$4152 \pm 172$	$4158 \pm 183$	$8.92 \pm 0.04$	$8.93 \pm 0.05$
493	$43 \pm 6$	$53 \pm 6$	$4520 \pm 166$	$3749 \pm 346$	$8.91 \pm 0.05$	$8.80 \pm 0.09$



Table 2—Continued

Number	$L_{1450}$ $10^{44} \text{ erg s}^{-1}$		$\sigma_{\text{C IV}}$ $\text{km s}^{-1}$		$\log(M_{\text{BH}}/M_{\odot})$	
	HSN	LSN	HSN	LSN	HSN	LSN
494	$27 \pm 8$	$37 \pm 8$	$3680 \pm 401$	$3189 \pm 514$	$8.62 \pm 0.12$	$8.57 \pm 0.15$
495	$426 \pm 16$	$403 \pm 17$	$3406 \pm 62$	$3432 \pm 66$	$9.19 \pm 0.02$	$9.18 \pm 0.02$
496	$59 \pm 6$	$63 \pm 6$	$3603 \pm 95$	$3588 \pm 103$	$8.78 \pm 0.03$	$8.80 \pm 0.04$
497	$214 \pm 17$	$168 \pm 15$	$3859 \pm 130$	$4027 \pm 108$	$9.14 \pm 0.03$	$9.12 \pm 0.03$
498	$52 \pm 11$	$46 \pm 11$	$3271 \pm 238$	$3678 \pm 199$	$8.67 \pm 0.08$	$8.74 \pm 0.07$
499	$158 \pm 14$	$116 \pm 17$	$4060 \pm 96$	$3668 \pm 222$	$9.11 \pm 0.03$	$8.95 \pm 0.06$
500	$75 \pm 14$	$2 \pm 0$	$3372 \pm 281$	$5744 \pm 1145$	$8.78 \pm 0.09$	$8.45 \pm 0.19$
501	$97 \pm 15$	$97 \pm 22$	$3523 \pm 143$	$3380 \pm 279$	$8.88 \pm 0.05$	$8.84 \pm 0.09$
502	$53 \pm 11$	$47 \pm 13$	$3131 \pm 640$	$2911 \pm 720$	$8.64 \pm 0.18$	$8.55 \pm 0.22$
503	$57 \pm 9$	$58 \pm 12$	$3077 \pm 432$	$2359 \pm 686$	$8.64 \pm 0.13$	$8.41 \pm 0.26$
504	$83 \pm 20$	$86 \pm 21$	$4093 \pm 194$	$3285 \pm 384$	$8.97 \pm 0.07$	$8.79 \pm 0.12$
505	$259 \pm 22$	$252 \pm 26$	$3482 \pm 50$	$3521 \pm 57$	$9.09 \pm 0.02$	$9.10 \pm 0.03$
506	$257 \pm 19$	$257 \pm 23$	$3012 \pm 91$	$3033 \pm 106$	$8.97 \pm 0.03$	$8.97 \pm 0.04$
507	$341 \pm 69$	$387 \pm 77$	$3910 \pm 156$	$4223 \pm 124$	$9.26 \pm 0.06$	$9.35 \pm 0.05$
508	$185 \pm 17$	$197 \pm 24$	$4004 \pm 117$	$3618 \pm 236$	$9.14 \pm 0.03$	$9.06 \pm 0.06$
509	$74 \pm 16$	$66 \pm 21$	$4064 \pm 248$	$3470 \pm 593$	$8.94 \pm 0.07$	$8.78 \pm 0.17$
510	$72 \pm 17$	$75 \pm 26$	$3140 \pm 186$	$2554 \pm 404$	$8.71 \pm 0.08$	$8.54 \pm 0.16$
511	$276 \pm 41$	$286 \pm 67$	$3735 \pm 80$	$3338 \pm 182$	$9.17 \pm 0.04$	$9.08 \pm 0.07$
512	$58 \pm 10$	$59 \pm 14$	$3466 \pm 262$	$3485 \pm 339$	$8.75 \pm 0.08$	$8.76 \pm 0.10$
513	$111 \pm 11$	$109 \pm 15$	$4399 \pm 152$	$4119 \pm 277$	$9.10 \pm 0.04$	$9.04 \pm 0.07$
514	$73 \pm 12$	$75 \pm 16$	$3439 \pm 160$	$3490 \pm 212$	$8.79 \pm 0.06$	$8.81 \pm 0.07$
515	$41 \pm 9$	$36 \pm 12$	$3433 \pm 273$	$3072 \pm 599$	$8.66 \pm 0.09$	$8.53 \pm 0.19$
516	$93 \pm 13$	$80 \pm 17$	$3664 \pm 161$	$3626 \pm 195$	$8.90 \pm 0.05$	$8.86 \pm 0.07$
517	$82 \pm 7$	$85 \pm 10$	$3750 \pm 71$	$3884 \pm 88$	$8.89 \pm 0.03$	$8.93 \pm 0.03$
518	$21 \pm 12$	$10 \pm 9$	$2852 \pm 478$	$3183 \pm 280$	$8.34 \pm 0.20$	$8.27 \pm 0.23$
519	$177 \pm 27$	$170 \pm 22$	$3679 \pm 133$	$3643 \pm 114$	$9.05 \pm 0.05$	$9.04 \pm 0.04$
520	$77 \pm 11$	$89 \pm 10$	$3426 \pm 225$	$3217 \pm 223$	$8.80 \pm 0.07$	$8.78 \pm 0.07$
521	$183 \pm 37$	$147 \pm 30$	$3431 \pm 313$	$2766 \pm 488$	$9.00 \pm 0.09$	$8.76 \pm 0.16$
522	$71 \pm 14$	$67 \pm 13$	$4248 \pm 183$	$4139 \pm 246$	$8.97 \pm 0.06$	$8.93 \pm 0.07$

Table 2—Continued

Number	$L_{1450}$ $10^{44} \text{ erg s}^{-1}$		$\sigma_{\text{C IV}}$ $\text{km s}^{-1}$		$\log(M_{\text{BH}}/M_{\odot})$	
	HSN	LSN	HSN	LSN	HSN	LSN
523	$253 \pm 26$	$216 \pm 25$	$3554 \pm 135$	$3231 \pm 190$	$9.11 \pm 0.04$	$8.99 \pm 0.06$
524	$46 \pm 11$	$53 \pm 12$	$3485 \pm 323$	$3265 \pm 325$	$8.70 \pm 0.10$	$8.67 \pm 0.10$
525	$90 \pm 16$	$99 \pm 16$	$4617 \pm 247$	$4487 \pm 194$	$9.10 \pm 0.06$	$9.09 \pm 0.05$
526	$130 \pm 13$	$145 \pm 12$	$3407 \pm 81$	$3448 \pm 77$	$8.92 \pm 0.03$	$8.95 \pm 0.03$
527	$129 \pm 16$	$131 \pm 13$	$2362 \pm 524$	$3785 \pm 133$	$8.60 \pm 0.19$	$9.01 \pm 0.04$
528	$112 \pm 7$	$102 \pm 9$	$3415 \pm 108$	$3455 \pm 130$	$8.88 \pm 0.03$	$8.87 \pm 0.04$
529	$146 \pm 8$	$154 \pm 9$	$3510 \pm 114$	$3478 \pm 135$	$8.97 \pm 0.03$	$8.97 \pm 0.04$
530	$76 \pm 7$	$93 \pm 12$	$3006 \pm 139$	$2780 \pm 227$	$8.68 \pm 0.05$	$8.66 \pm 0.08$
531	$75 \pm 6$	$94 \pm 9$	$3288 \pm 92$	$3203 \pm 128$	$8.76 \pm 0.03$	$8.79 \pm 0.04$
532	$50 \pm 9$	$58 \pm 17$	$4129 \pm 183$	$4052 \pm 288$	$8.87 \pm 0.06$	$8.88 \pm 0.09$
533	$110 \pm 14$	$120 \pm 31$	$4357 \pm 167$	$3350 \pm 857$	$9.09 \pm 0.05$	$8.88 \pm 0.23$
534	$47 \pm 9$	$50 \pm 17$	$3803 \pm 173$	$3930 \pm 268$	$8.78 \pm 0.06$	$8.82 \pm 0.10$
535	$339 \pm 33$	$324 \pm 64$	$3104 \pm 186$	$2859 \pm 490$	$9.06 \pm 0.06$	$8.97 \pm 0.16$
536	$56 \pm 7$	$57 \pm 12$	$3689 \pm 178$	$4288 \pm 183$	$8.79 \pm 0.05$	$8.93 \pm 0.06$
537	$42 \pm 7$	$36 \pm 12$	$4151 \pm 63$	$3942 \pm 154$	$8.83 \pm 0.04$	$8.75 \pm 0.09$
538	$41 \pm 12$	$4 \pm 2$	$3341 \pm 498$	$6197 \pm 808$	$8.64 \pm 0.15$	$8.68 \pm 0.17$
539	$27 \pm 7$	$21 \pm 19$	$4425 \pm 222$	$4462 \pm 498$	$8.78 \pm 0.08$	$8.74 \pm 0.23$
540	$453 \pm 36$	$458 \pm 62$	$3213 \pm 94$	$3690 \pm 137$	$9.15 \pm 0.03$	$9.27 \pm 0.05$
541	$91 \pm 8$	$92 \pm 16$	$3264 \pm 143$	$2934 \pm 393$	$8.80 \pm 0.04$	$8.71 \pm 0.12$
542	$182 \pm 18$	$211 \pm 35$	$3325 \pm 233$	$3724 \pm 305$	$8.97 \pm 0.07$	$9.10 \pm 0.08$
543	$174 \pm 26$	$152 \pm 47$	$3321 \pm 230$	$3518 \pm 521$	$8.96 \pm 0.07$	$8.98 \pm 0.15$
544	$33 \pm 8$	$37 \pm 15$	$3654 \pm 119$	$3861 \pm 202$	$8.67 \pm 0.06$	$8.74 \pm 0.10$
545	$116 \pm 20$	$116 \pm 16$	$2797 \pm 297$	$2413 \pm 311$	$8.72 \pm 0.10$	$8.59 \pm 0.12$
546	$122 \pm 19$	$109 \pm 18$	$3585 \pm 141$	$3468 \pm 146$	$8.95 \pm 0.05$	$8.89 \pm 0.05$
547	$95 \pm 12$	$92 \pm 11$	$3690 \pm 112$	$3683 \pm 121$	$8.91 \pm 0.04$	$8.90 \pm 0.04$
548	$301 \pm 56$	$220 \pm 49$	$4123 \pm 252$	$4013 \pm 205$	$9.27 \pm 0.07$	$9.18 \pm 0.07$
549	$104 \pm 15$	$92 \pm 13$	$4049 \pm 166$	$3445 \pm 224$	$9.02 \pm 0.05$	$8.85 \pm 0.07$
550	$99 \pm 14$	$96 \pm 12$	$4346 \pm 161$	$4809 \pm 89$	$9.06 \pm 0.05$	$9.15 \pm 0.03$
551	$164 \pm 16$	$180 \pm 15$	$3692 \pm 99$	$3372 \pm 106$	$9.04 \pm 0.03$	$8.98 \pm 0.03$

Table 2—Continued

Number	$L_{1450}$ $10^{44} \text{ erg s}^{-1}$		$\sigma_{\text{C IV}}$ $\text{km s}^{-1}$		$\log(M_{\text{BH}}/M_{\odot})$	
	HSN	LSN	HSN	LSN	HSN	LSN
552	$84 \pm 10$	$102 \pm 11$	$4279 \pm 198$	$4597 \pm 202$	$9.01 \pm 0.05$	$9.12 \pm 0.05$
553	$194 \pm 13$	$239 \pm 15$	$3176 \pm 112$	$3447 \pm 117$	$8.95 \pm 0.03$	$9.07 \pm 0.03$
554	$105 \pm 60$	$185 \pm 71$	$3882 \pm 240$	$3612 \pm 365$	$8.98 \pm 0.14$	$9.05 \pm 0.13$
555	$46 \pm 8$	$55 \pm 9$	$3576 \pm 51$	$3564 \pm 49$	$8.72 \pm 0.04$	$8.76 \pm 0.04$
556	$124 \pm 27$	$148 \pm 30$	$3559 \pm 303$	$3842 \pm 214$	$8.94 \pm 0.09$	$9.05 \pm 0.07$
557	$203 \pm 24$	$267 \pm 27$	$3824 \pm 166$	$3987 \pm 138$	$9.12 \pm 0.05$	$9.22 \pm 0.04$
558	$34 \pm 15$	$36 \pm 9$	$3049 \pm 796$	$3416 \pm 368$	$8.52 \pm 0.25$	$8.62 \pm 0.11$
559	$32 \pm 18$	$76 \pm 12$	$3989 \pm 265$	$3723 \pm 184$	$8.73 \pm 0.14$	$8.87 \pm 0.06$
560	$298 \pm 70$	$296 \pm 61$	$2912 \pm 142$	$2794 \pm 122$	$8.97 \pm 0.07$	$8.93 \pm 0.06$
561	$211 \pm 118$	$127 \pm 97$	$3334 \pm 221$	$3304 \pm 139$	$9.01 \pm 0.14$	$8.88 \pm 0.18$
562	$78 \pm 13$	$120 \pm 12$	$3196 \pm 201$	$3312 \pm 164$	$8.74 \pm 0.07$	$8.87 \pm 0.05$
563	$64 \pm 9$	$76 \pm 9$	$3699 \pm 148$	$3454 \pm 181$	$8.83 \pm 0.05$	$8.81 \pm 0.05$
564	$100 \pm 10$	$131 \pm 13$	$3484 \pm 109$	$3743 \pm 103$	$8.87 \pm 0.04$	$9.00 \pm 0.03$
565	$159 \pm 15$	$127 \pm 18$	$4435 \pm 56$	$4572 \pm 56$	$9.19 \pm 0.02$	$9.17 \pm 0.03$
566	$22 \pm 8$	$33 \pm 10$	$3546 \pm 211$	$3114 \pm 503$	$8.54 \pm 0.10$	$8.52 \pm 0.16$
567	$246 \pm 37$	$317 \pm 48$	$3100 \pm 220$	$2221 \pm 525$	$8.98 \pm 0.07$	$8.75 \pm 0.21$
568	$111 \pm 10$	$101 \pm 11$	$3403 \pm 158$	$3451 \pm 165$	$8.88 \pm 0.05$	$8.87 \pm 0.05$
569	$197 \pm 22$	$189 \pm 31$	$4202 \pm 91$	$3950 \pm 165$	$9.19 \pm 0.03$	$9.13 \pm 0.05$
570	$90 \pm 10$	$104 \pm 14$	$3284 \pm 99$	$3374 \pm 125$	$8.80 \pm 0.04$	$8.86 \pm 0.04$
571	$116 \pm 9$	$88 \pm 10$	$2710 \pm 217$	$3110 \pm 199$	$8.69 \pm 0.07$	$8.75 \pm 0.06$
572	$99 \pm 8$	$90 \pm 10$	$3568 \pm 138$	$3146 \pm 313$	$8.89 \pm 0.04$	$8.76 \pm 0.09$
573	$49 \pm 8$	$54 \pm 9$	$4791 \pm 250$	$4659 \pm 263$	$8.99 \pm 0.06$	$8.99 \pm 0.06$
574	$40 \pm 6$	$47 \pm 7$	$3333 \pm 141$	$3438 \pm 121$	$8.63 \pm 0.05$	$8.69 \pm 0.05$
575	$237 \pm 20$	$222 \pm 5$	$3981 \pm 41$	$3941 \pm 52$	$9.19 \pm 0.02$	$9.16 \pm 0.01$
576	$513 \pm 70$	$2 \pm 0$	$4162 \pm 238$	$10060 \pm 846$	$9.41 \pm 0.06$	$8.97 \pm 0.08$
577	$69 \pm 10$	$57 \pm 12$	$3568 \pm 168$	$2842 \pm 451$	$8.81 \pm 0.05$	$8.57 \pm 0.15$
578	$158 \pm 9$	$133 \pm 12$	$3503 \pm 108$	$3765 \pm 104$	$8.99 \pm 0.03$	$9.01 \pm 0.03$
579	$164 \pm 11$	$203 \pm 16$	$3630 \pm 76$	$3595 \pm 105$	$9.02 \pm 0.02$	$9.07 \pm 0.03$
580	$38 \pm 6$	$46 \pm 8$	$3779 \pm 142$	$3689 \pm 212$	$8.73 \pm 0.05$	$8.75 \pm 0.07$

Table 2—Continued

Number	$L_{1450}$ $10^{44} \text{ erg s}^{-1}$		$\sigma_{\text{C IV}}$ $\text{km s}^{-1}$		$\log(M_{\text{BH}}/M_{\odot})$	
	HSN	LSN	HSN	LSN	HSN	LSN
581	$64 \pm 6$	$68 \pm 8$	$3078 \pm 178$	$3155 \pm 203$	$8.67 \pm 0.05$	$8.70 \pm 0.06$
582	$47 \pm 6$	$53 \pm 7$	$3698 \pm 171$	$3885 \pm 202$	$8.75 \pm 0.05$	$8.83 \pm 0.06$
583	$220 \pm 18$	$217 \pm 24$	$3609 \pm 135$	$3261 \pm 292$	$9.09 \pm 0.04$	$9.00 \pm 0.08$
584	$97 \pm 10$	$82 \pm 12$	$3670 \pm 44$	$3723 \pm 59$	$8.91 \pm 0.03$	$8.89 \pm 0.04$
585	$81 \pm 7$	$112 \pm 10$	$4051 \pm 148$	$3704 \pm 252$	$8.96 \pm 0.04$	$8.96 \pm 0.06$
586	$99 \pm 10$	$107 \pm 14$	$4018 \pm 132$	$3901 \pm 162$	$9.00 \pm 0.04$	$8.99 \pm 0.05$
587	$169 \pm 14$	$159 \pm 16$	$3521 \pm 112$	$3237 \pm 161$	$9.00 \pm 0.03$	$8.92 \pm 0.05$
588	$62 \pm 6$	$57 \pm 6$	$3008 \pm 155$	$3288 \pm 126$	$8.64 \pm 0.05$	$8.69 \pm 0.04$
589	$203 \pm 14$	$157 \pm 13$	$2612 \pm 288$	$3637 \pm 106$	$8.79 \pm 0.10$	$9.02 \pm 0.03$
590	$51 \pm 5$	$47 \pm 5$	$3510 \pm 129$	$3095 \pm 164$	$8.73 \pm 0.04$	$8.60 \pm 0.05$
591	$143 \pm 7$	$116 \pm 7$	$4286 \pm 53$	$3834 \pm 79$	$9.14 \pm 0.02$	$8.99 \pm 0.02$
592	$174 \pm 7$	$141 \pm 8$	$3370 \pm 46$	$3316 \pm 58$	$8.97 \pm 0.02$	$8.91 \pm 0.02$
593	$43 \pm 6$	$49 \pm 5$	$3979 \pm 171$	$3803 \pm 186$	$8.80 \pm 0.05$	$8.79 \pm 0.05$
594	$77 \pm 6$	$80 \pm 6$	$2194 \pm 610$	$3423 \pm 239$	$8.41 \pm 0.24$	$8.81 \pm 0.06$
595	$280 \pm 46$	$303 \pm 50$	$3616 \pm 97$	$3861 \pm 90$	$9.14 \pm 0.04$	$9.22 \pm 0.04$
596	$11 \pm 5$	$19 \pm 5$	$4097 \pm 264$	$4685 \pm 208$	$8.52 \pm 0.12$	$8.75 \pm 0.07$
597	$84 \pm 7$	$76 \pm 8$	$3861 \pm 107$	$3614 \pm 128$	$8.92 \pm 0.03$	$8.84 \pm 0.04$
598	$187 \pm 19$	$127 \pm 23$	$3029 \pm 191$	$3406 \pm 206$	$8.90 \pm 0.06$	$8.91 \pm 0.07$
599	$66 \pm 9$	$57 \pm 14$	$4111 \pm 130$	$3447 \pm 497$	$8.92 \pm 0.04$	$8.74 \pm 0.14$
600	$98 \pm 21$	$73 \pm 32$	$3585 \pm 266$	$4095 \pm 283$	$8.90 \pm 0.08$	$8.94 \pm 0.12$
601	$310 \pm 22$	$315 \pm 40$	$3907 \pm 82$	$3656 \pm 197$	$9.23 \pm 0.02$	$9.18 \pm 0.06$
602	$543 \pm 26$	$494 \pm 41$	$3040 \pm 78$	$3144 \pm 143$	$9.15 \pm 0.03$	$9.15 \pm 0.04$
603	$108 \pm 11$	$90 \pm 19$	$3116 \pm 170$	$3342 \pm 241$	$8.80 \pm 0.05$	$8.82 \pm 0.08$
604	$961 \pm 50$	$764 \pm 80$	$3562 \pm 93$	$3075 \pm 245$	$9.41 \pm 0.03$	$9.23 \pm 0.07$
605	$81 \pm 11$	$44 \pm 18$	$2830 \pm 404$	$3362 \pm 563$	$8.65 \pm 0.13$	$8.66 \pm 0.18$
606	$18 \pm 7$	$29 \pm 11$	$4811 \pm 88$	$4883 \pm 178$	$8.77 \pm 0.10$	$8.89 \pm 0.10$
607	$180 \pm 11$	$105 \pm 12$	$3435 \pm 161$	$3068 \pm 314$	$9.00 \pm 0.04$	$8.78 \pm 0.09$
608	$64 \pm 9$	$69 \pm 16$	$3517 \pm 133$	$3821 \pm 172$	$8.78 \pm 0.05$	$8.87 \pm 0.07$
609	$511 \pm 41$	$432 \pm 64$	$3638 \pm 142$	$3694 \pm 177$	$9.29 \pm 0.04$	$9.26 \pm 0.05$

Table 2—Continued

Number	$L_{1450}$ $10^{44} \text{ erg s}^{-1}$		$\sigma_{\text{C IV}}$ $\text{km s}^{-1}$		$\log(M_{BH}/M_{\odot})$	
	HSN	LSN	HSN	LSN	HSN	LSN
610	$203 \pm 23$	$243 \pm 47$	$3831 \pm 158$	$3584 \pm 366$	$9.12 \pm 0.04$	$9.10 \pm 0.10$
611	$102 \pm 7$	$96 \pm 11$	$3539 \pm 126$	$3330 \pm 233$	$8.89 \pm 0.04$	$8.83 \pm 0.07$
612	$72 \pm 9$	$85 \pm 17$	$4152 \pm 164$	$3897 \pm 266$	$8.95 \pm 0.05$	$8.94 \pm 0.08$
613	$586 \pm 56$	$567 \pm 84$	$3521 \pm 87$	$3943 \pm 90$	$9.29 \pm 0.03$	$9.38 \pm 0.04$
614	$89 \pm 11$	$97 \pm 18$	$3757 \pm 162$	$3749 \pm 277$	$8.91 \pm 0.05$	$8.93 \pm 0.08$
615	$89 \pm 52$	$82 \pm 77$	$3030 \pm 400$	$3344 \pm 589$	$8.73 \pm 0.18$	$8.80 \pm 0.26$

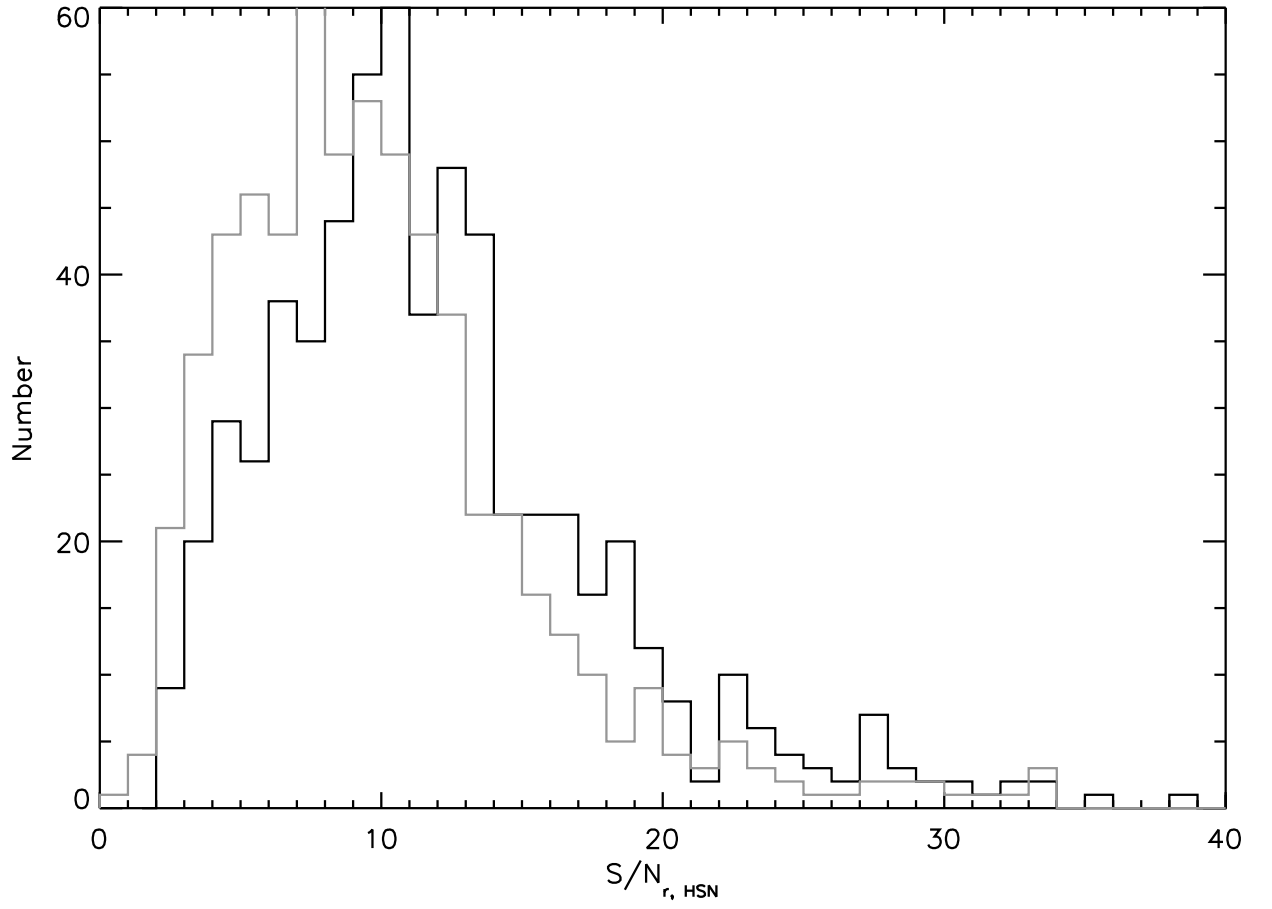


Fig. 1.—  $r$ -band signal-to-noise ratio at the high-S/N (dark histogram) and low-S/N (gray histogram) epochs.

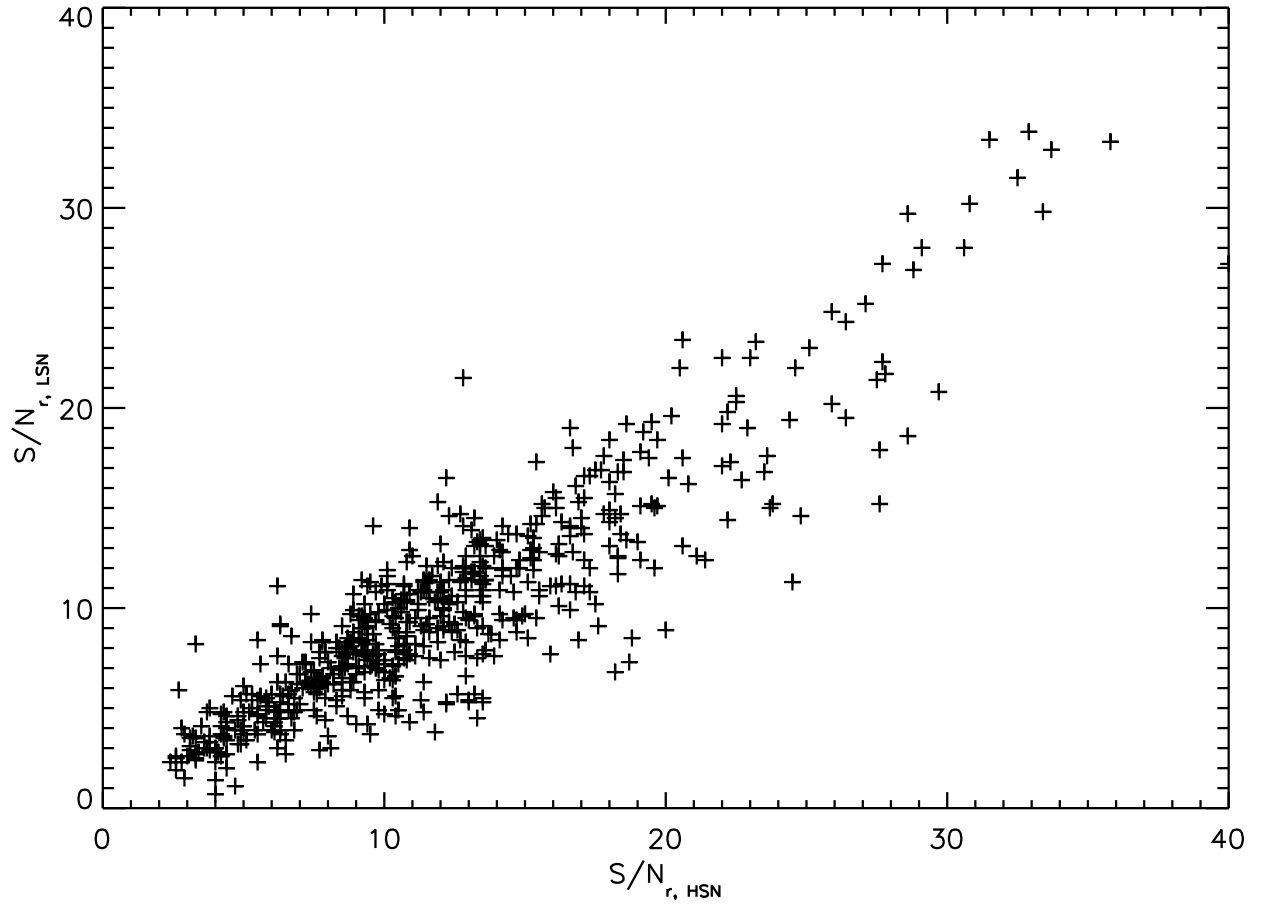


Fig. 2.—  $r$ -band signal-to-noise ratio at the high-S/N epoch versus the same quantity at the low-S/N epoch.

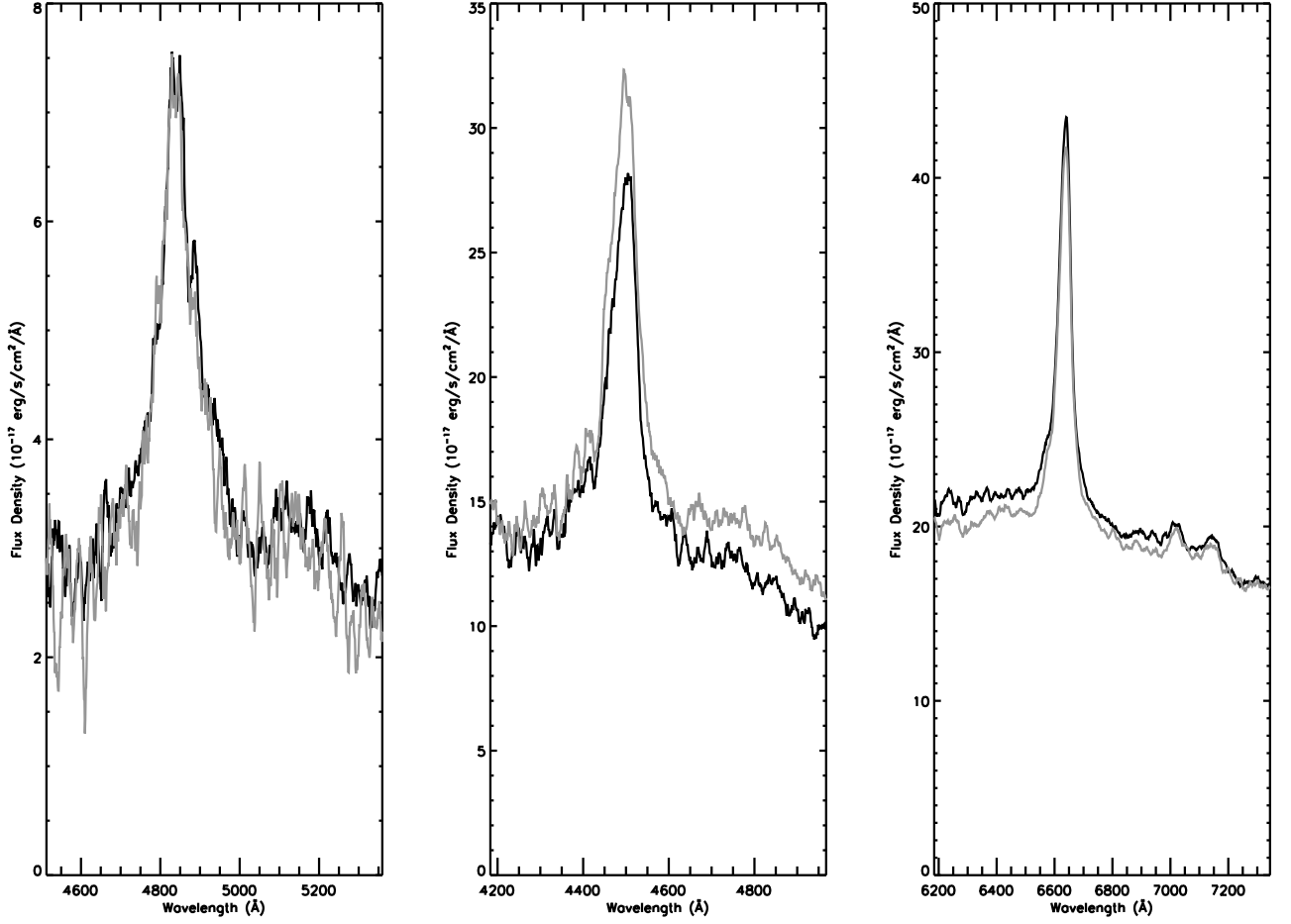


Fig. 3.— Example spectra from the quasars studied in this paper, with objects increasing in spectra signal-to-noise ratio from left to right. Shown in the observed frame are the regions of the spectra used in the estimation of black hole mass. Dark curves represent the spectra from the high-S/N epoch, while grey curves are those spectra for the low-S/N epoch. (Left) SDSS J150104.94–010727.9;  $S/N_{r,\text{HSN}}=4.9$  (Center) SDSS J101416.97+484816.1;  $S/N_{r,\text{HSN}}=12.1$  (Right) SDSS J030449.86–000813.4;  $S/N_{r,\text{HSN}}=30.8$ .



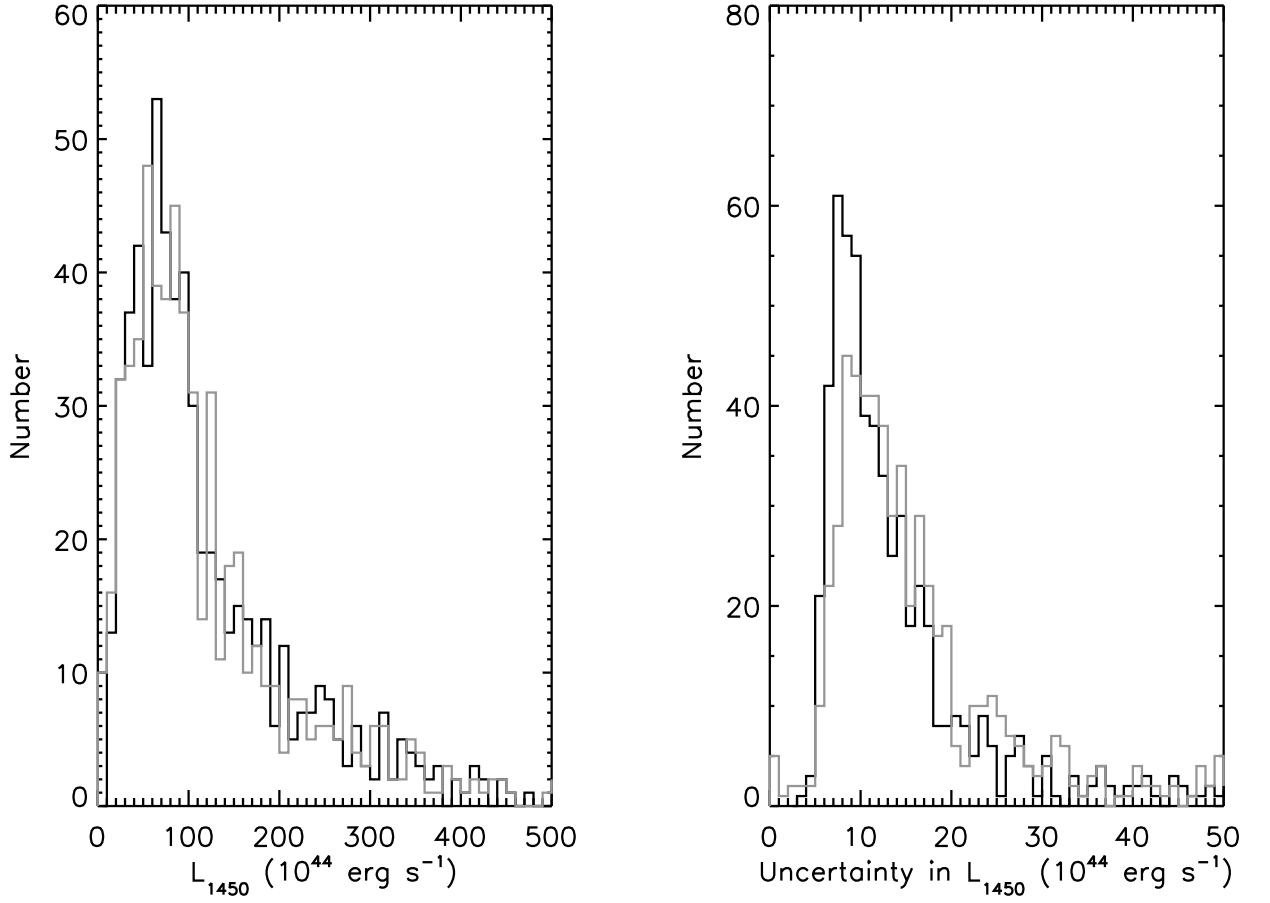


Fig. 4.— (Left) 1450Å luminosity ( $L_{1450}$ ) at the high-S/N (dark histogram) and low-S/N (gray histogram) epochs. (Right) Uncertainty in the 1450Å luminosity at the high-S/N (dark histogram) and low-S/N (gray histogram) epochs.

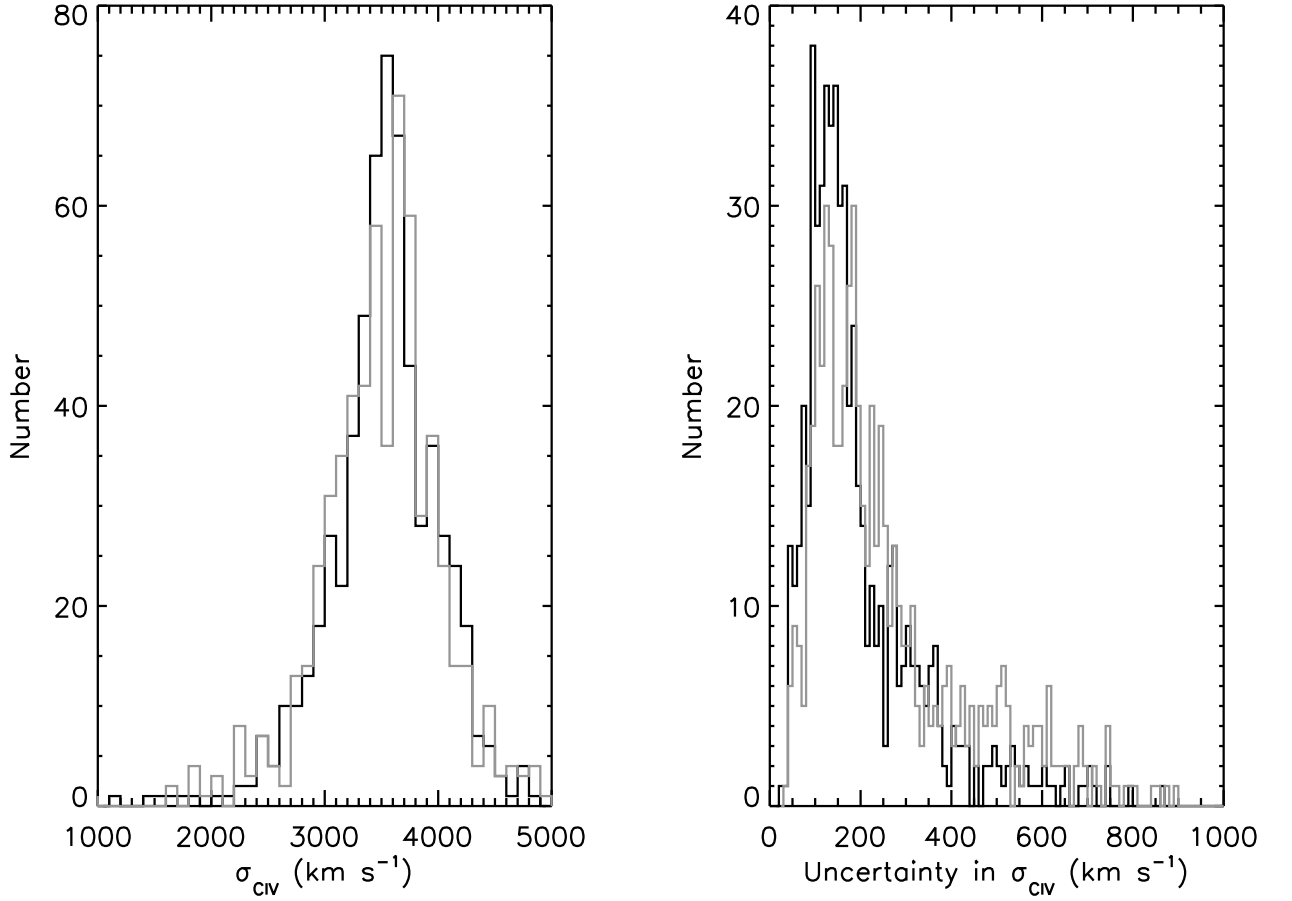


Fig. 5.— (Left) C IV line dispersion ( $\sigma_{CIV}$ ) at the high-S/N (dark histogram) and low-S/N (gray histogram) epochs. (Right) Uncertainty in the C IV line dispersion at the high-S/N (dark histogram) and low-S/N (gray histogram) epochs.

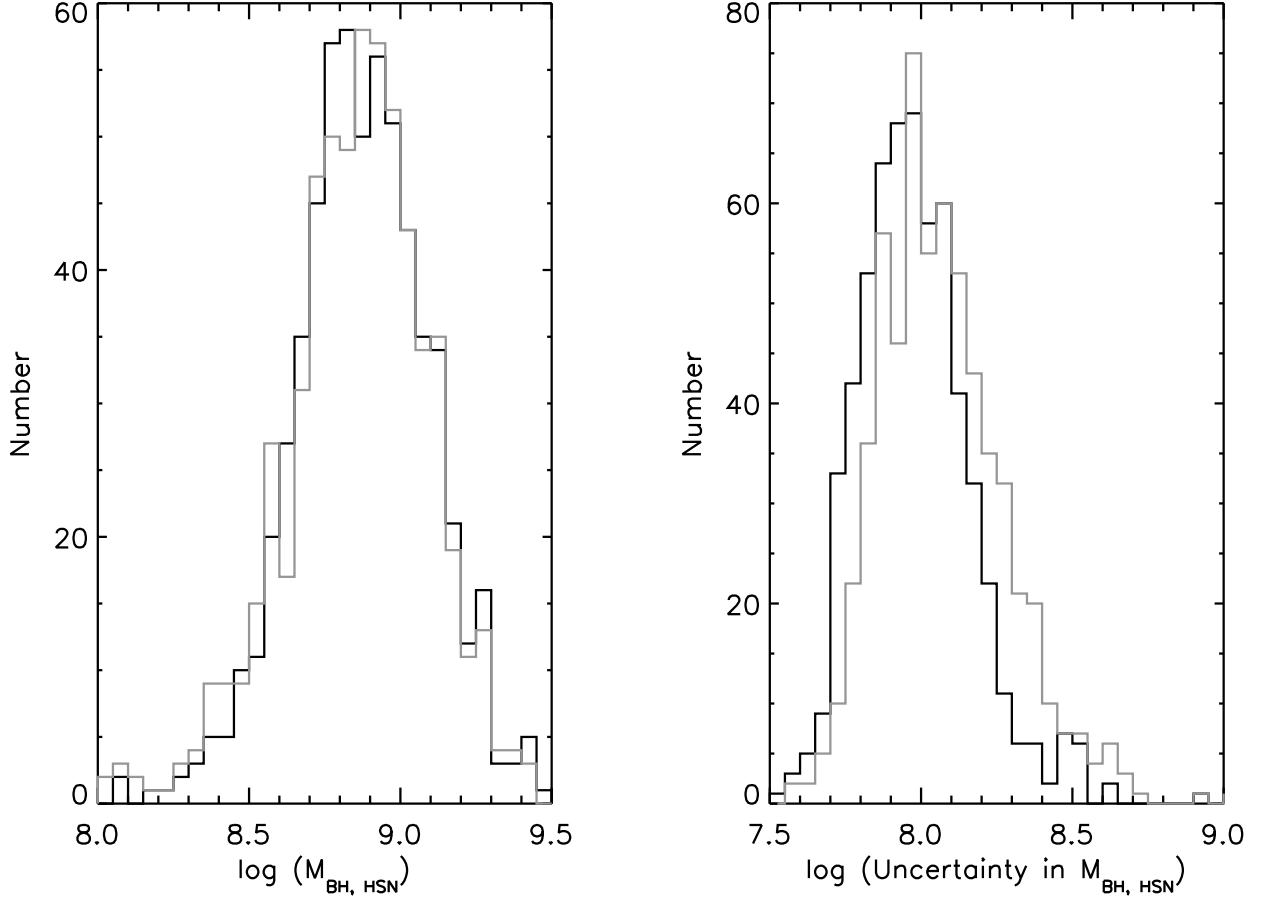


Fig. 6.— (Left) Logarithm of the estimated black hole mass ( $M_{BH}$ ) at high-S/N (dark histogram) and low-S/N (gray histogram) epochs. (Right) Logarithm of the uncertainty ((calculated by propagating measurement errors in  $L_{1450}$  and  $\sigma_{CIV}$ ) in the estimated black hole mass at the high-S/N (dark histogram) and low-S/N (gray histogram) epochs.

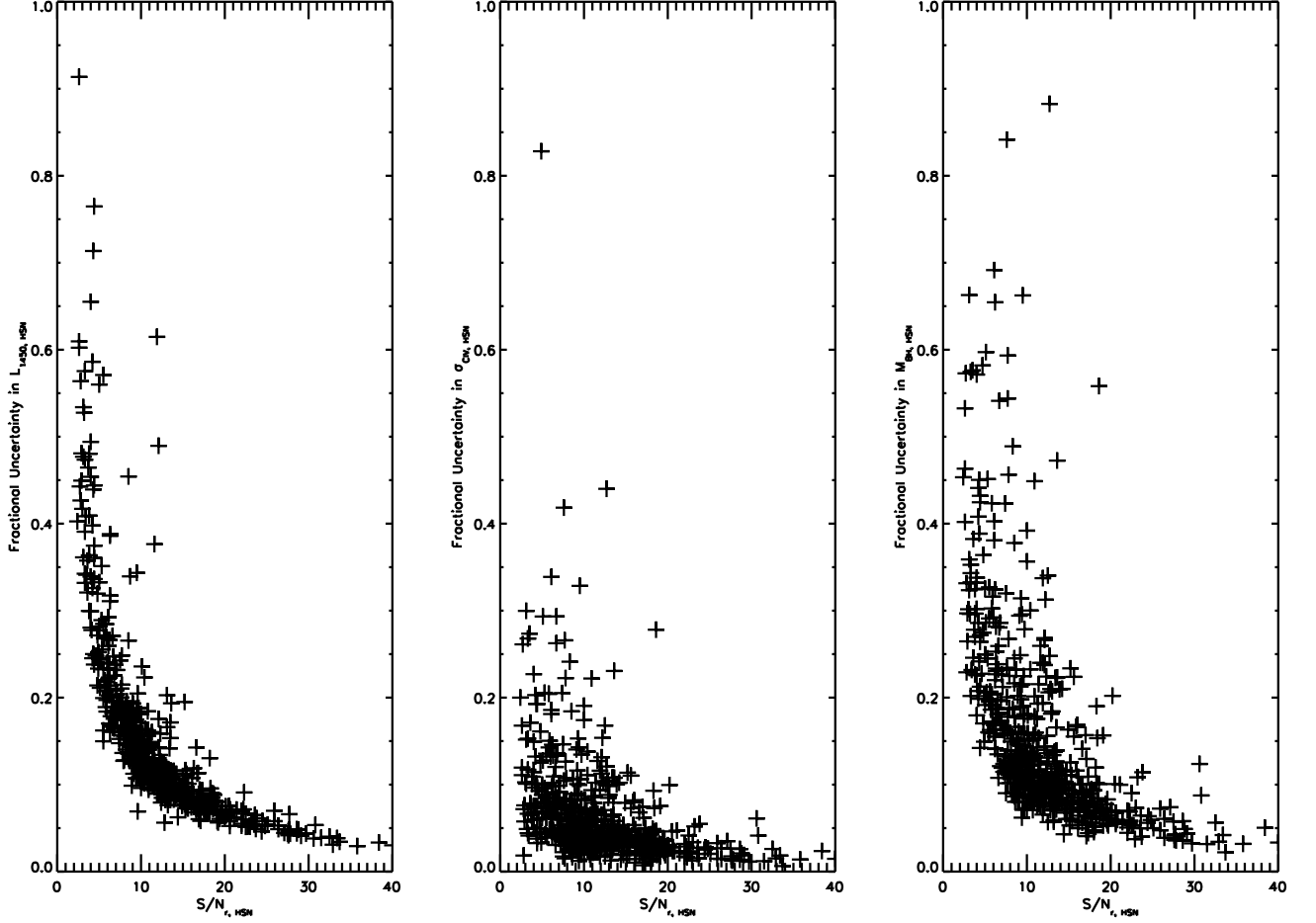


Fig. 7.— (Left) Fractional measurement uncertainty in the 1450Å luminosity ( $\sigma_{L_{1450}}/L_{1450}$ ) as a function of  $r$ -band signal-to-noise ratio ( $S/N_r$ ) at the high- $S/N$  epoch. (Center) The same, but for uncertainty in the C IV line dispersion. (Right) The same, but for uncertainty in the estimated black hole mass.

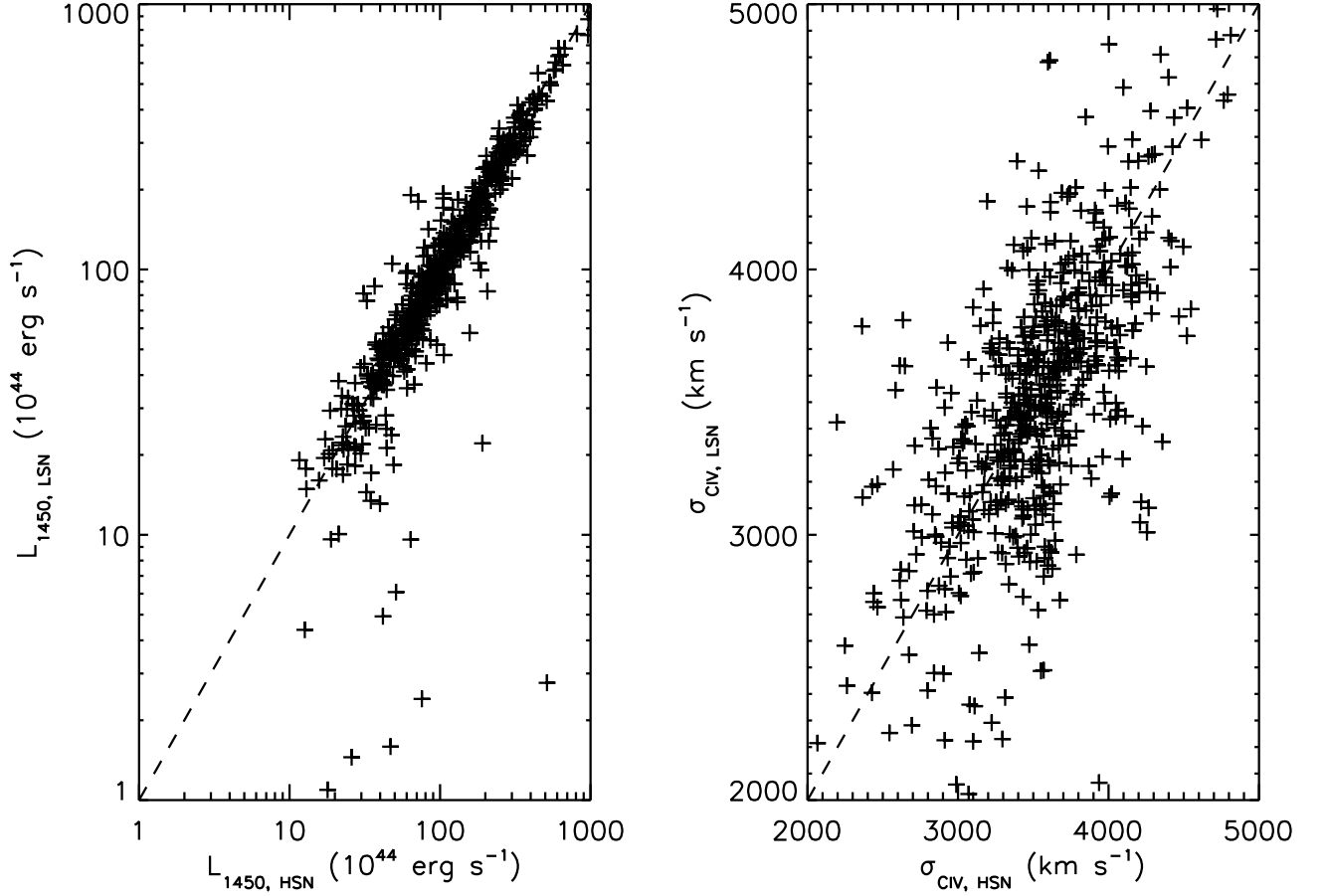


Fig. 8.— (Left) 1450Å luminosity at the high-S/N epoch ( $L_{1450,\text{HSN}}$ ) versus the same quantity at the low-S/N epoch ( $L_{1450,\text{LSN}}$ ). (Right) C IV line dispersion at the high-S/N epoch ( $\sigma_{\text{CIV},\text{HSN}}$ ) versus the same quantity at the low-S/N epoch ( $\sigma_{\text{CIV},\text{LSN}}$ ). The dashed lines indicate zero change in the quantities between epochs.

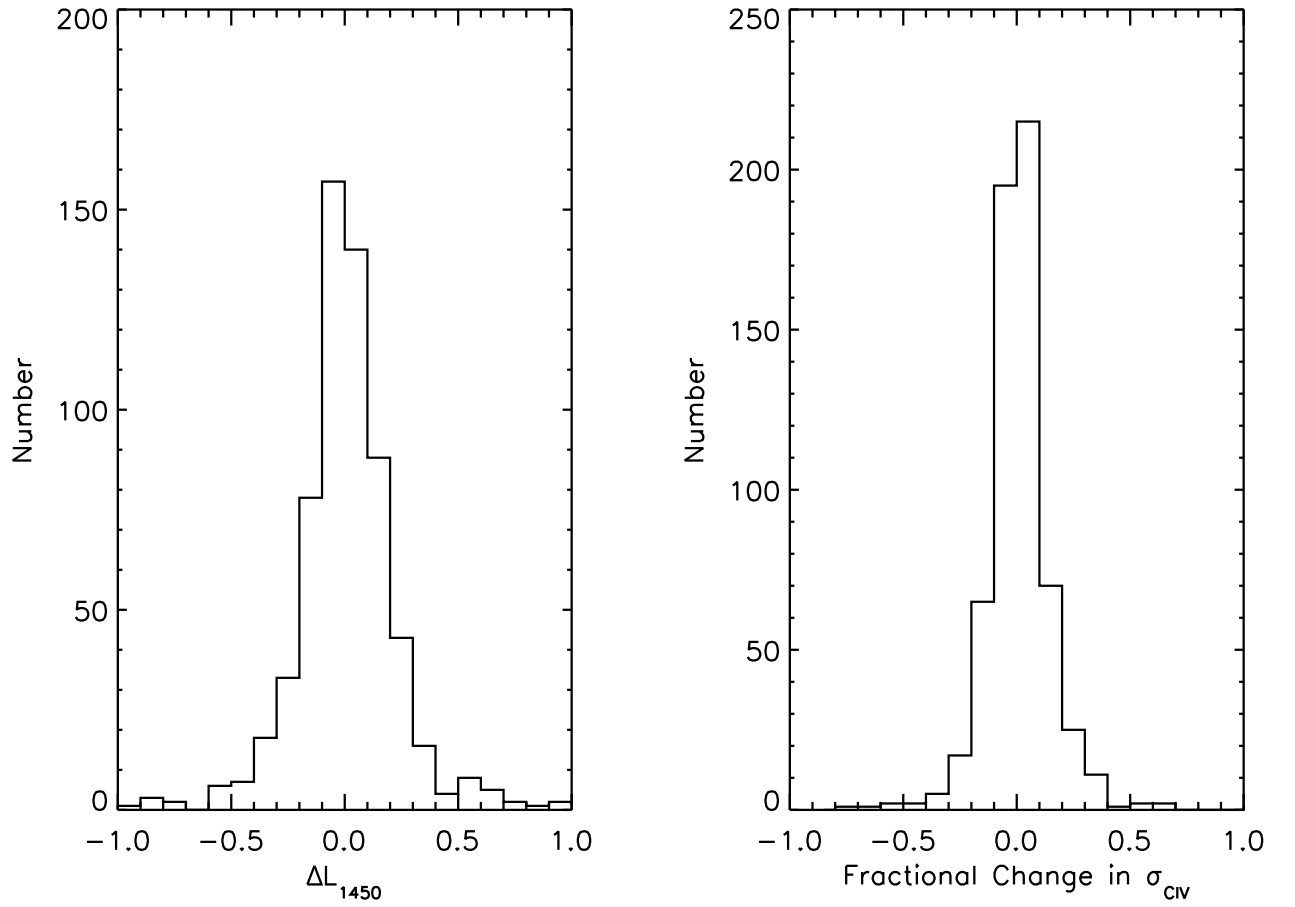


Fig. 9.— (Left) Fractional change in 1450Å luminosity. The standard deviation of the sample is 0.161. (Right) Fractional change in C IV line dispersion. The standard deviation is 0.108.

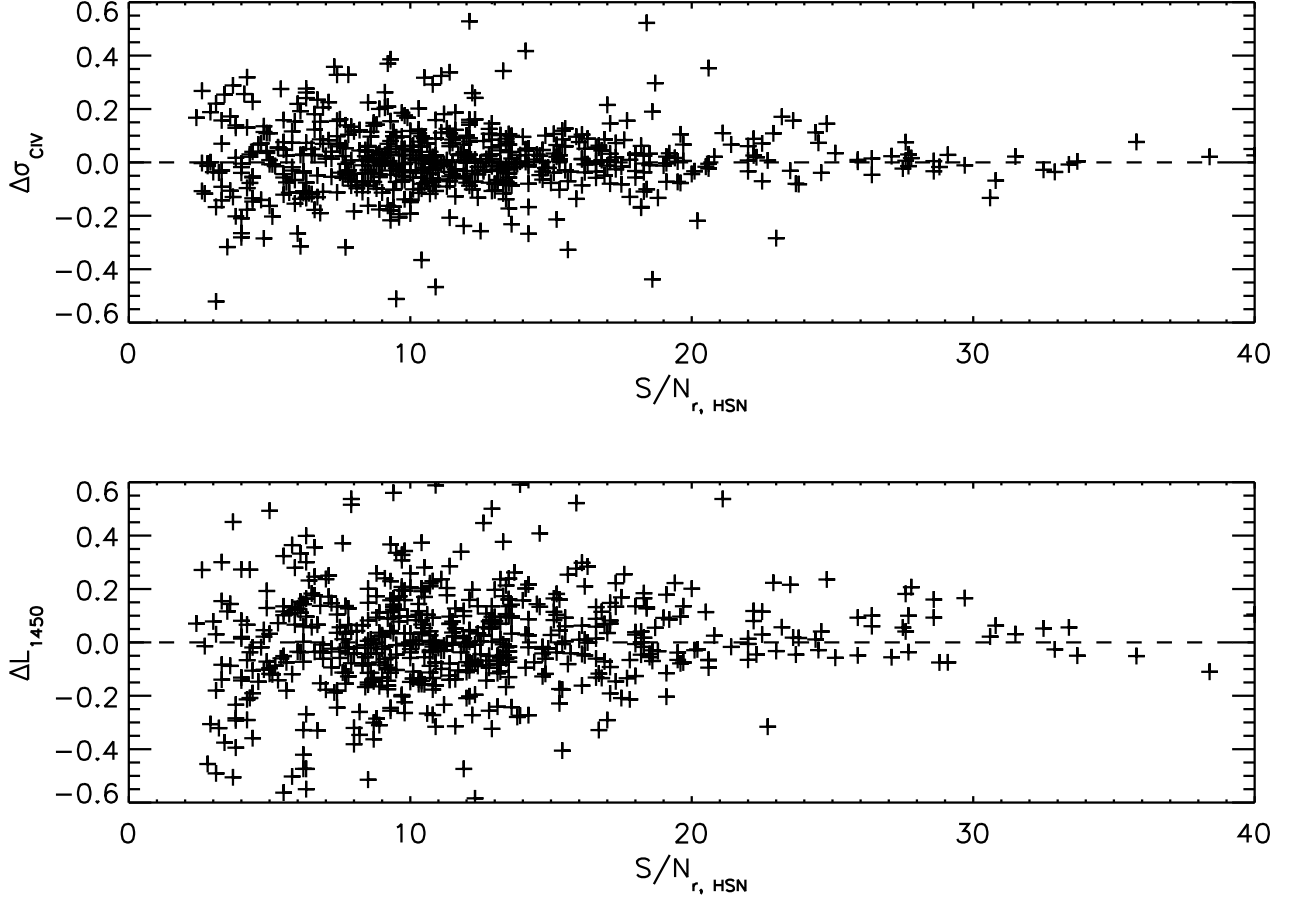


Fig. 10.— (Upper) Fractional change in C IV line dispersion as a function of  $r$ -band signal-to-noise ratio at the high-S/N epoch. (Lower) Fractional change in 1450Å luminosity as a function of  $r$ -band signal-to-noise ratio at the high-S/N epoch. The dashed lines indicate zero change in the quantities between epochs.

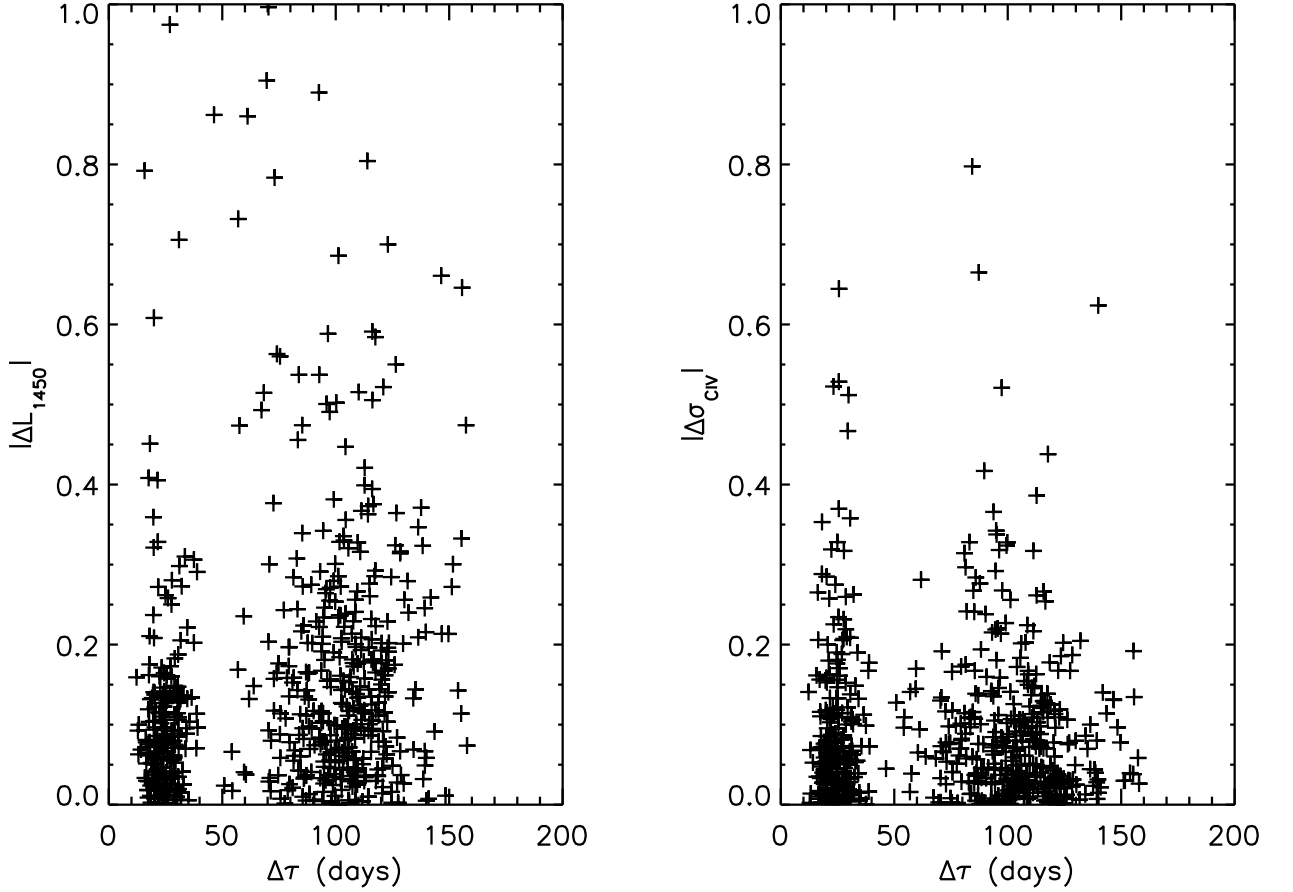


Fig. 11.— (Left) Absolute value of the fractional change in 1450Å luminosity as a function of rest-frame time lag between epochs. (Right) Absolute value of the fractional change in C IV line dispersion as a function of rest-frame time lag between epochs.



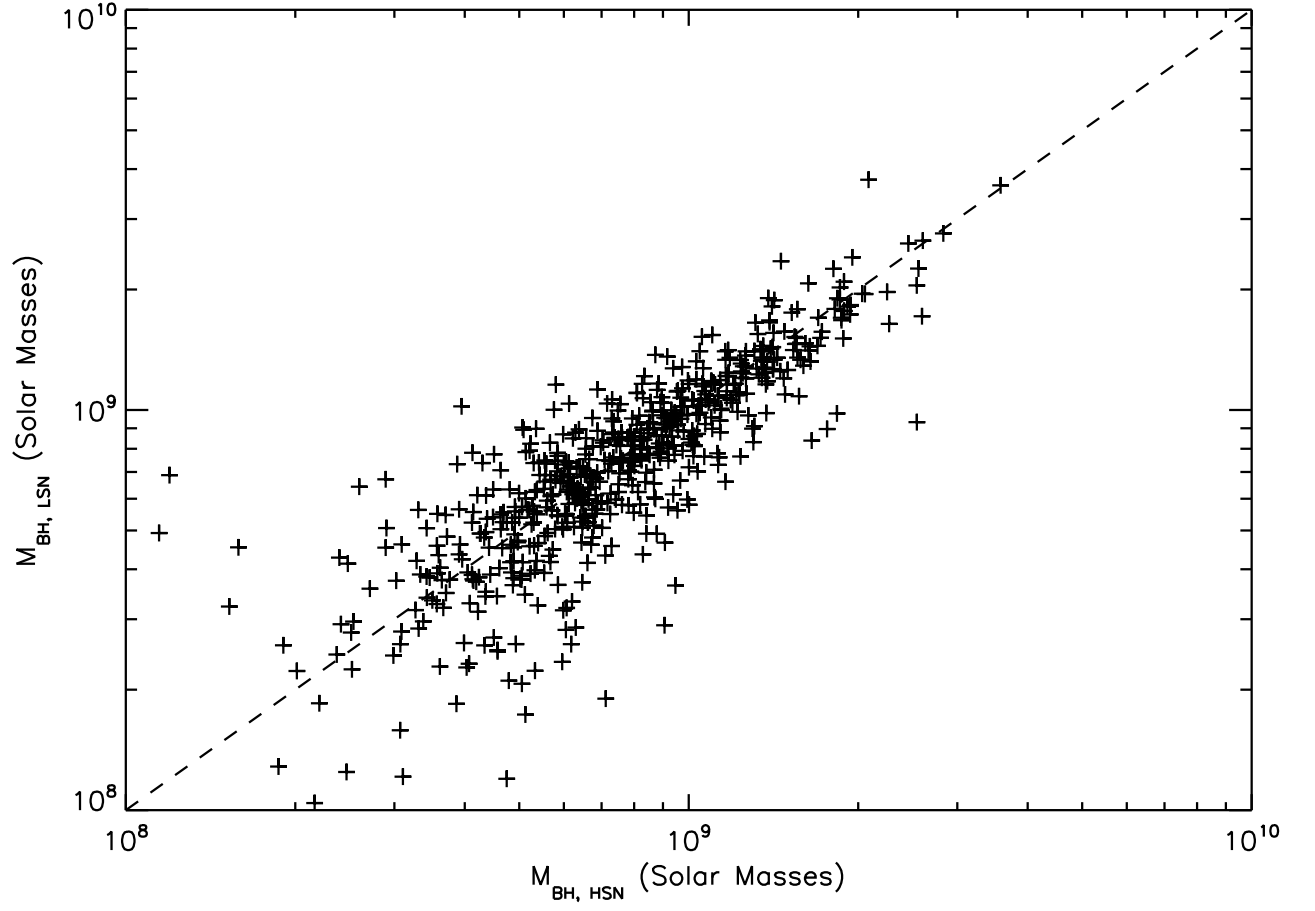


Fig. 12.— Estimated black hole mass at the high-S/N epoch versus the same quantity at the low-S/N epoch. The dashed line indicates zero change in  $M_{\text{BH}}$  between epochs.

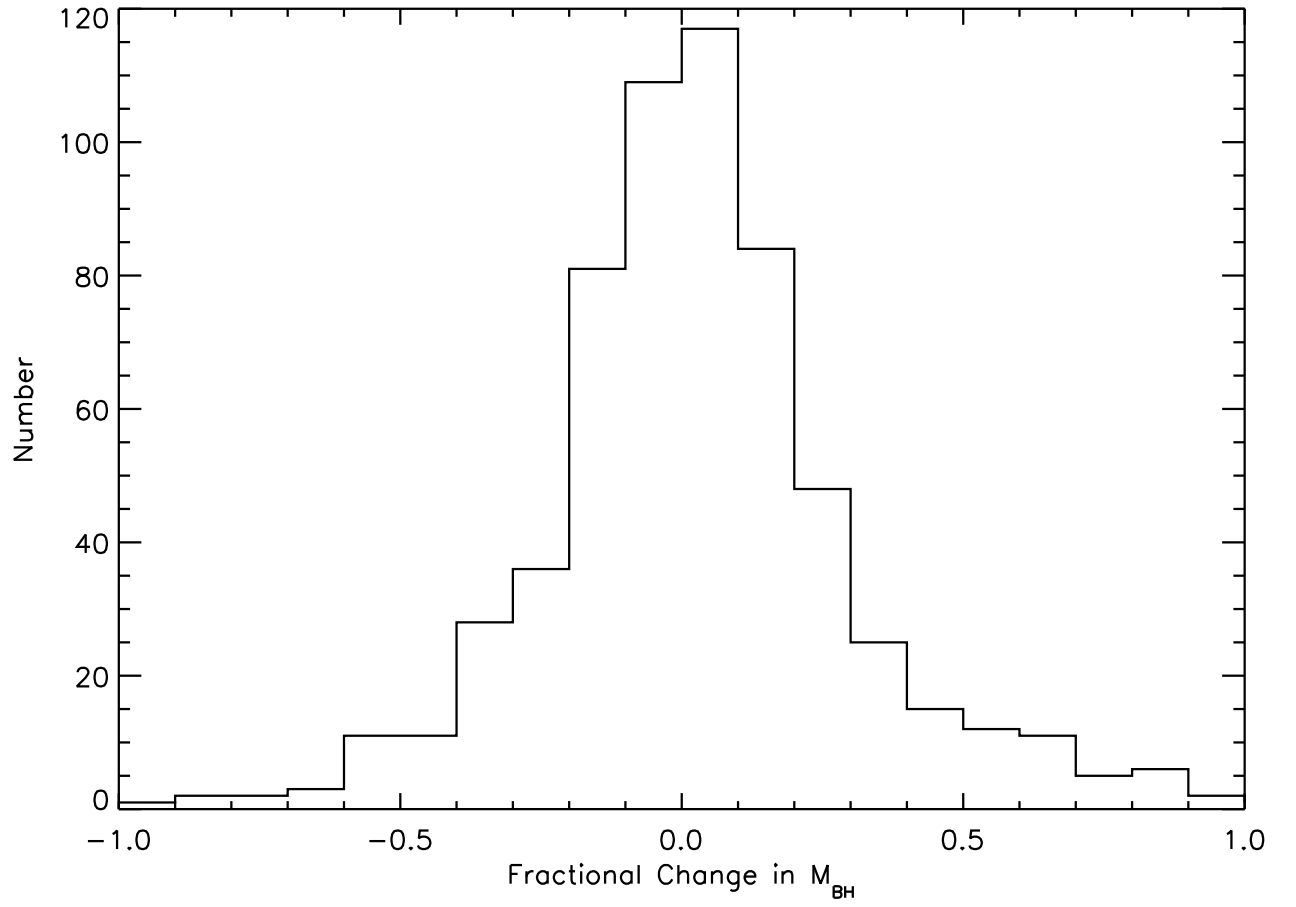


Fig. 13.— Fractional change in estimated black hole mass. The standard deviation of the sample is 0.301.

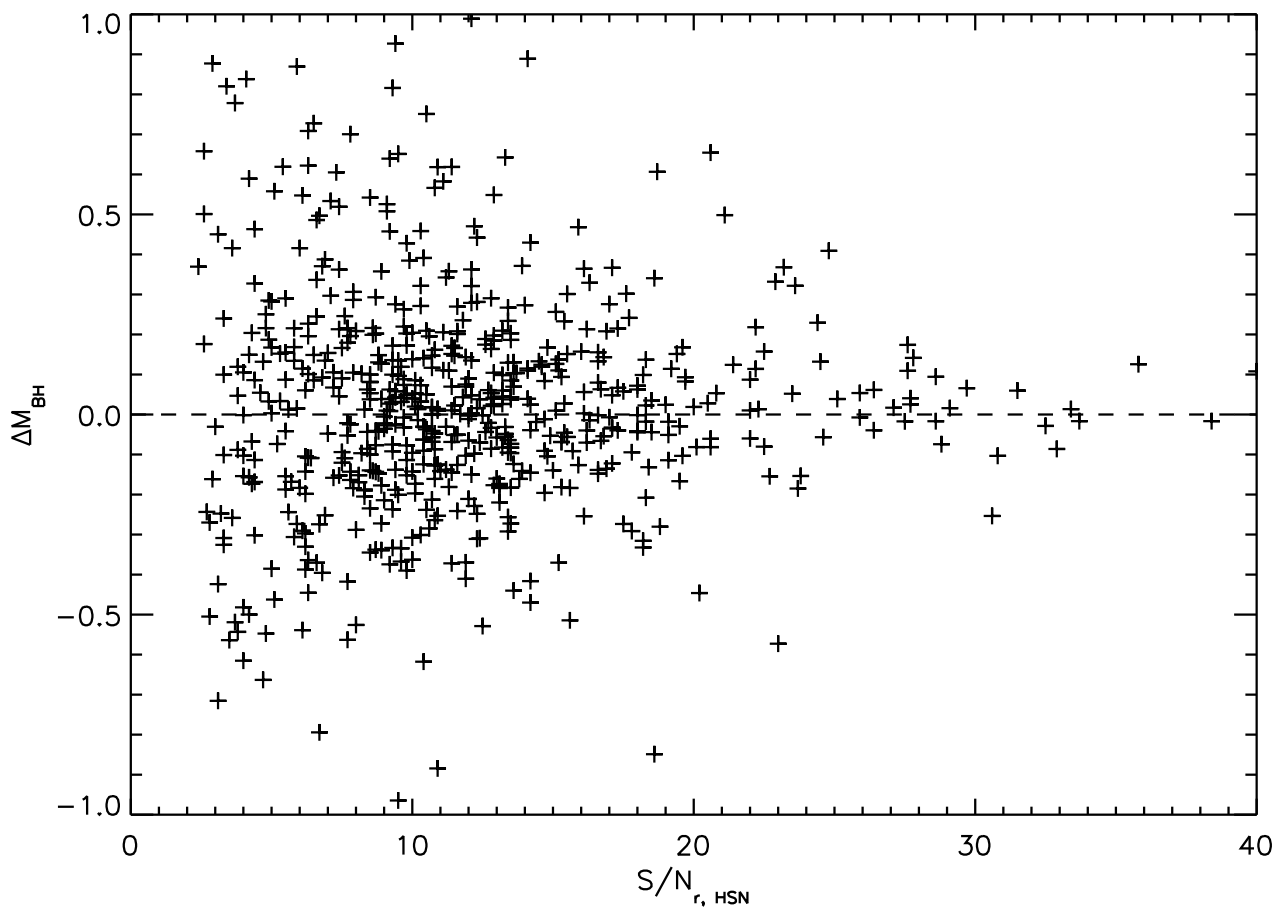


Fig. 14.— Fractional change in estimated black hole mass as a function of  $r$ -band signal-to-noise ratio at the high-S/N epoch. The dashed line indicates zero change in  $M_{\text{BH}}$  between epochs.

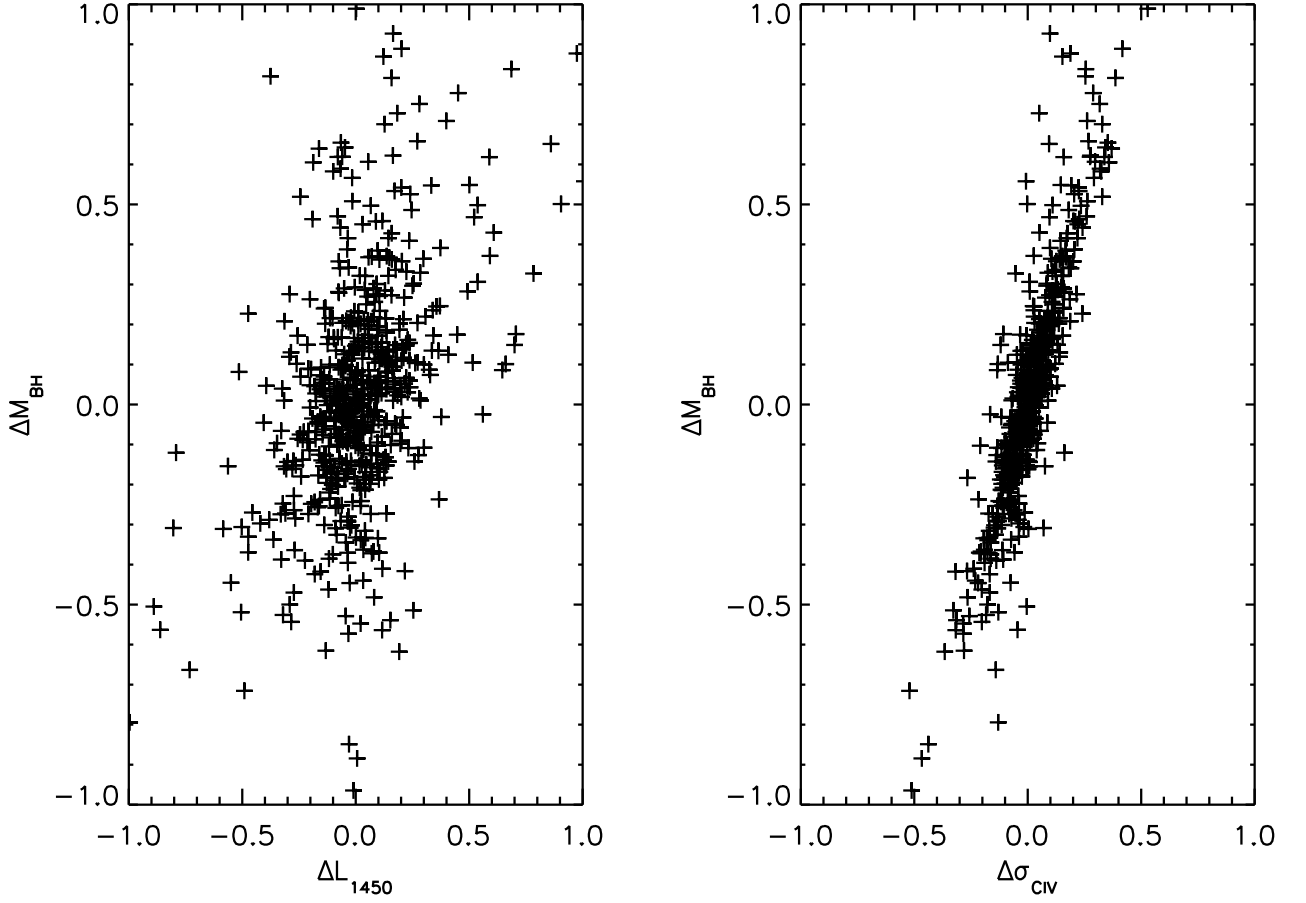


Fig. 15.— (Left) Fractional change in estimated black hole mass as a function of the fractional change in 1450Å luminosity. (Right) Fractional change in estimated black hole mass as a function of the fractional change in the C IV line dispersion.